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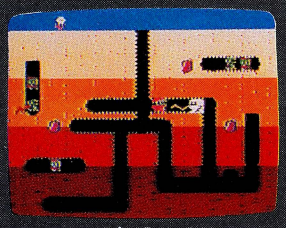
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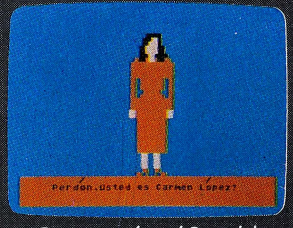

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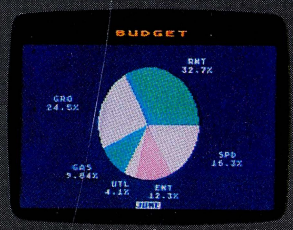

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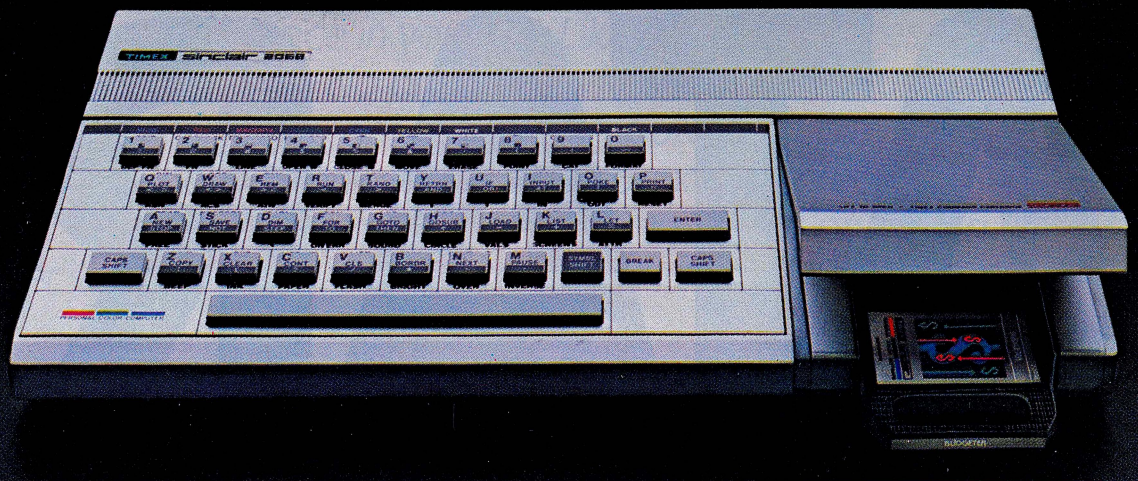

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NOVEMBER 1983 VOL. 1, NO. 2

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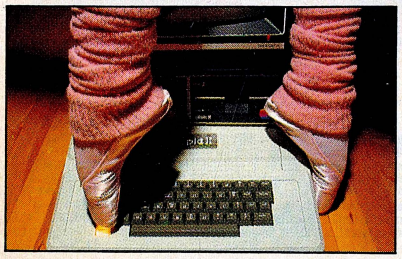

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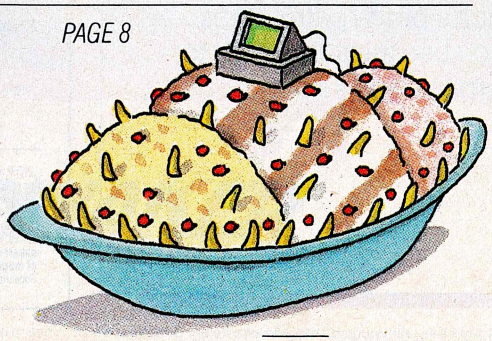

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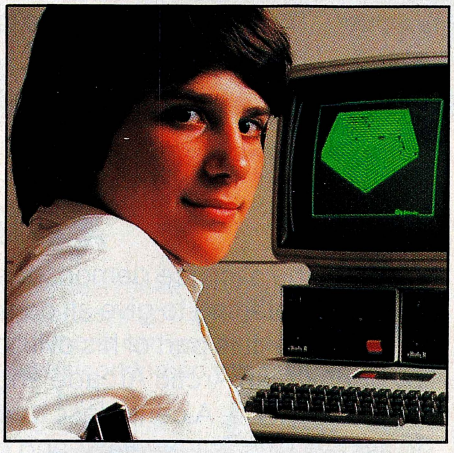

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Cover Illustration © Rafal Olbinski

IN THIS ISSUE

This issue of ENTER invites you into a world of adventure. The computer keyboard has created a whole new way to be adventurous—if you can type, you can be a hero. You can use your computer to solve multi-leveled mysteries or explore distant, imaginary planets. Our cover story, "Escape to Adventure," which begins on page 16, gives you a glimpse into these new realms of excitement.

In popular adventure games you are a hero, following your computer-crafted destiny. But, you can also create your own destiny—by creating adventure worlds of your own. On page 21, we give you hints for doing so, in a very simple way. To show you how simple, yet enjoyable, a computer adventure can be, we have created a similar game you can play within this issue of ENTER. On this page, you'll find the beginnings of a print adventure game we call "Ice Pirates." It pits you against Glich, the Ice Demon, and his cold-hearted cohorts. After you've read each scene and decided what action to take, turn to the appropriate page. The wrong choice sends you back to the beginning or ends your adventure early—with your flash-frozen demise. The right choice leads to victory and a frost-free future. Good questing!

ICE PIRATES

BY JIM LEWIS

Glich, the alien ice demon, has stolen an enchanted ice maker and is threatening to give all computers and video games a case of frost byte. It is part of his evil scheme to win world domination by opening an Arctic Arcade and taking control of the planet's pocket change. A cents-less crime! You alone are brave enough to assault Glich's secret lair and get back the enchanted ice maker. You are armed with a sizzling saber, which can defeat all foes except Glich, and a flask of magic hot chocolate, which can make you invisible for a few minutes. Remember, you can only use one weapon at a time. Choose carefully.

At the start of your journey, you are floating on a block of ice in the Arctic sea. Suddenly, one of Glich's pirate patrol ships appears. It is headed right at you. If you use the saber, turn to page 46. If you drink from the flask, turn to page 44.

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If you play it smart, you'll make enough to expand the railroad into new territories. If you don't? Well, you'll understand how a business can go bankrupt! Either way, you're going to find that working on this railroad is a challenge—and a lot of fun!

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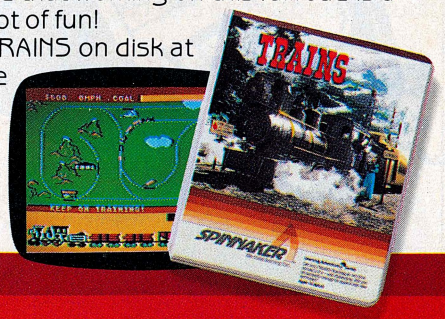

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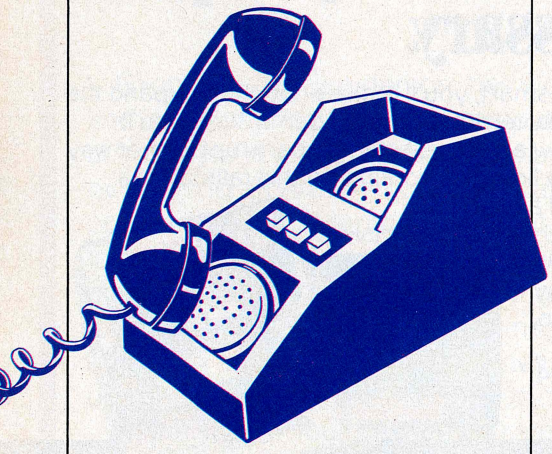
Q&A

BY PHIL WISWELL

DEAR ENTER: What is a MODEM?
—David Weissman,
New York, N.Y.

DEAR DAVID: A MODEM is a device that allows computers to "talk" to each other over telephone wires. It changes the electronic pulses inside your computer into vibrations that telephones can understand. It also decodes telephone signals so your computer can understand them.

The name MODEM comes from the words MOdulator/DEModulator. This is quite a mouthful, but all it means is that a modem has two parts. One side of the modem turns computer signals into vibrations (MOdulator); the other side turns phone vibrations into computer signals (DEModulator).



Using a MODEM, you can talk to other microcomputers. Or you can connect with big, information utility mainframes, like The Source, for all kinds of services. You can even play adventure games with other computer owners over a MODEM. We'll have an article on MODEM gaming in an upcoming issue.

DEAR ENTER: What's the advantage of a special monitor when I already have a great color TV?
—Peter Evans Brownback IV,
Southern Pines, N.C.

DEAR PETER: If you are playing games most of the time, a color TV will do fine. *Pac-Man* will not look significantly better on a good monitor than on a good television set. In fact, some software companies claim they develop their games on lousy color televisions. They say that if a game looks good on a lousy TV, it will look even better to people with good TVs.

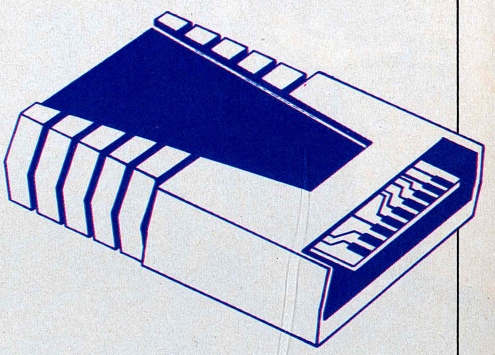
So, for game playing, a color TV is fine. But if you write your own programs, or if you do a lot of work with words, the monitor will give you a great advantage.

A monitor is a television without tuner and amplifier. Input to the monitor is a direct connection from the computer—you do not use an antenna switch box—so the monitor can accept much more concentrated signals than a regular TV. This means that you can get more text on the screen. On a color TV, you'd be able to get no more than 40 characters of type on any one line.With a monitor, you can get up to 80 characters on that same line. That will make your programming and text work faster and easier to review.

DEAR ENTER: How long will a video game last? Do programs wear out? —Lauren Zarom,
Brooklyn, N.Y.

DEAR LAUREN: Video games should last a long, long time. I've been playing some of my game cartridges for seven years, and not one that arrived in working order has had a problem yet.

Cartridges are probably the longest-lasting of all game programs. The beauty of the cartridge is that it has no moving parts—the entire program is implanted in micro-circuits on a small silicon chip. It cannot wear



out like an album or tape because no needles, hands or rollers ever touch it. I've heard you can ruin a program by putting it in or taking it out while the console power is turned on, but that's never happened when I've made those mistakes. Of course, you come across defective chips and electronic components now and then, but reliable manufacturers guarantee games for 90 days.

Game programs stored on cassette tape or floppy disc are more liable to wear out than those on plug-in cartridges. Cassette tape, which can snap, is especially delicate. You may want to protect programs you've written by making copies on tape or disc. Making copies of copyrighted games, though, is illegal.

If you have a question about computers or video games, we'd like to help. Just send your questions to: Q&A, ENTER Magazine, CTW, 1 Lincoln Pl., NY, NY, 10023.

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When you go in search of The Most Amazing Thing, don't expect to be home by dinner time.

Finding The Most Amazing Thing in the Whole Wide Galaxy isn't something you can do quickly.

In fact, you'll get so wrapped up in this computer game that you may have trouble coming back down to earth.

For starters, you get to fly, drive, bargain, eat, sleep, compose music, drill for oil, and speak 25 different languages.

Sound tough? Relax. You'll have the help of your old Uncle Smoke Bailey. He'll give you a B-liner (sort of a cross between a hot-air balloon and a dune buggy) to use on your journey. And he'll teach you about the Mire People and the strange languages they speak.

You'll visit the Metallican Auction, where you'll trade with tricky aliens. You'll shop for gadgets and gizmos to outfit the B-liner.

And you're off—in search of The Most Amazing Thing!

It will take time to find it.

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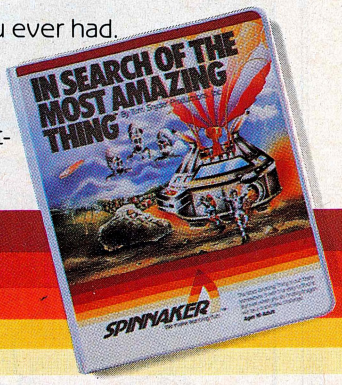

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bits

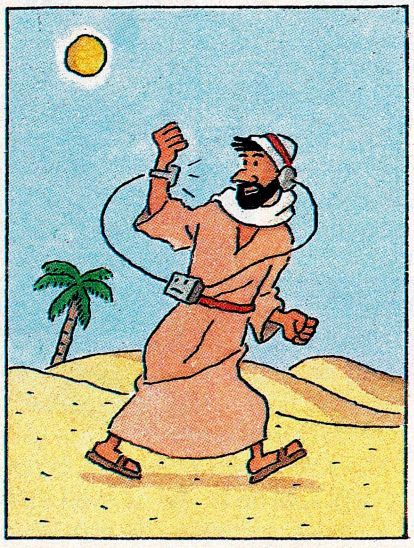
BY NORA ZAMICHOW

TINY TV

Seiko has announced a $495 TV-wristwatch with a 1.2-inch screen. Amazing, and just the perfect thing for discreet TV-watching, don't you think?

Unfortunately, there are still a few bugs in the system. First, you can't hear anything from your wrist-TV without a separate 6.5-ounce receiver and headphones. Not very discreet if you've got to wear headphones, right? Next, reception isn't supposed to be too good in subways, underground walkways or when blocked by mountains or high buildings. And, since the TV's liquid crystal screen creates images by reflecting the surrounding light, you can't watch it in the dark. Oh yeah, and the watch isn't waterproof, either.

So, here we have the perfect invention for watching TV in a sunny, dry place far from any obstacles. Like the Sahara Desert, maybe?



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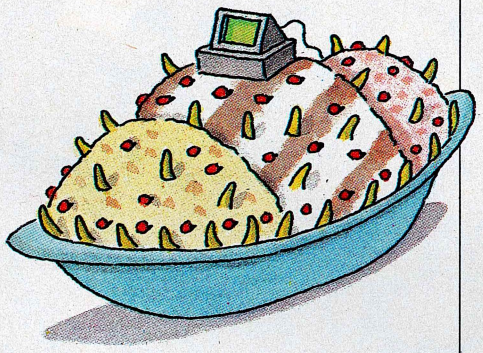
APPLE SUNDAE



What takes 9,000 maraschino cherries, 17,000 bananas and one apple? An 8,500-foot long banana split!

Last spring, the junior class of Millburn High School made a world record ice cream split using 8,000 pints of ice cream, 280 pounds of nuts, 280 gallons of chocolate syrup, and one Apple computer. The computer wasn't an ingredient—it was used to keep track of jobs for the 1,022 workers who assembled the sundae. We assume they had to work split shifts.

SAY, WHAT?

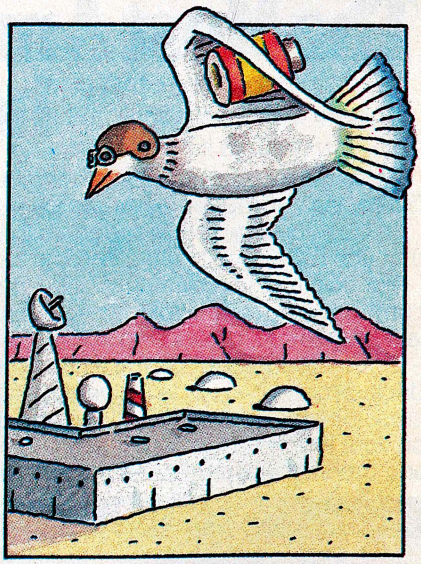
Several companies have been trying recently to come up with programs that will turn microcomputers into translators. When you speak English, the computer will respond in, say, Spanish. The problem is that computers are very literal in the way they interpret words. In fact, we just heard that a language translation system was tested by changing a sentence from English into Russian and back into English again.

The original sentence read: "The spirit is willing but the flesh is weak." The final version that came out of the computer was: "The vodka is good, but the meat is rotten."

Oh, well. Perhaps they could send their micro to Berlitz.

HIGH-TECH PIGEONS

At one end is a Lockheed Missile and Space Company engineering lab. At the other end is a high-tech computer center, where engineers' ideas are used to craft potential aerospace designs. How do you think vital information travels over the 50 mountainous miles between them? Fiber optic cables? Microwaves? Satellite transmissions?



Pigeons.

The ultra-high-techies at Lockheed have found that carrier pigeons are the most efficient way to transport the 35-mm film negatives of engineering drawings from one office to the other. Electronic printouts worked, but the drawings they produced were fuzzy and the cost was more than

ters, we'd just as soon let our fingers keep doing the walking to find a restaurant, and play our games at arcades.

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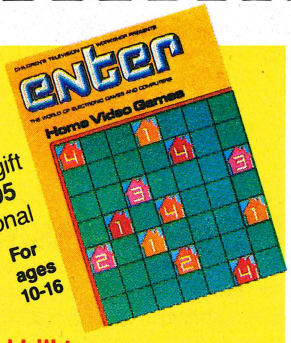

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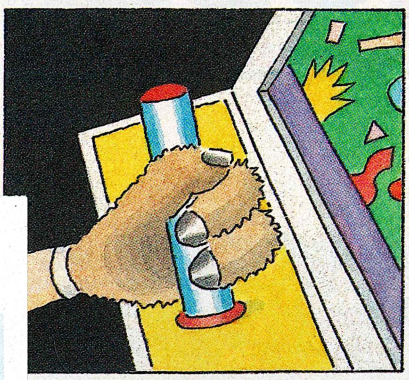
It sounds great, except for the part about the credit card number. If the terminals won't take quar-

GLOVE STORY



The Videomax is one more gim-icky item thumbing a ride on the omputer game highway. This .95 leather glove is designed to otect an arcade game player's nds from gruesome joystick isters and/or calluses. But, since e glove looks like the paw of a ree-toed sloth, it doesn't seem -fetched to predict that the re-onse of game players will be lidly thumbs down.

UN, IT SAID

First, we had Walkman to stroll th. Now, we have Coach to jog th. Coach is a three-ounce bio-mputer that records your heart te, the number of calories you're rning, and the distance, num-r of steps and speed you travel hile jogging. Once Coach is pro-ammed with your vital statistics ex, weight, stride, etc.) you put its chest strap and start run-ng. The strap's electrode moni-rs your body and sends the infor-ation back to the biocomputer. Of course, no self-respecting ach could stand on the side-es silently. This Coach beeps t the rate at which your feet ould hit the ground to cover the stance you want in the time you ant. And, if you feel exhausted, you can always chew out the beeping coach who set the pace.

(Continued on page 61)

bits

BY NORA ZAMICHOW

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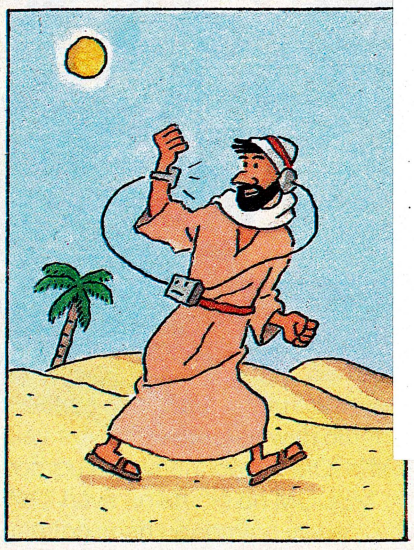

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Now we know where those rumors got started about American tech being for the birds.

VIDEO B-BALL

The rivalry between Julius "Dr. J" Irving and Larry Bird is no news to sports fans. But now, these two basketball stars will take their battle from the sports to the electronic arena. Electronic Arts of San Mateo, California, is creating a one-on-one basketball game, pitting Dr. J against Bird. It's scheduled to be released this month. What does Dr. J think his chances are of winning? "If I'm playing one-on-one," says Dr. J, "I'd beat Godzilla."

ROOM SERVICE

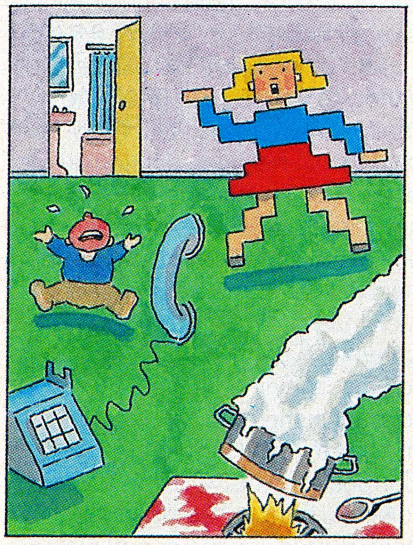
Thanks to Travelhost of Dallas, more than 100,000 hotel rooms will feature computer terminals by the end of this year. At Hiltons, Howard Johnson's, Holiday Inns and other hotels in more than 60 cities, you'll be able to punch a computer button on your room's TV, type in a credit card number, and play games,view menus of nearby restaurants, read sports scores and more.

It sounds great, except for the part about the credit card number. If the terminals won't take quarters, we'd just as soon let our fingers keep doing the walking to find a restaurant, and play our games at arcades.

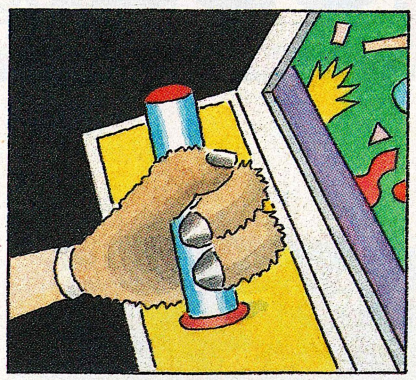
GAMES FOR PARENTS

Now there's a video game for harried mothers. In *Mad Dash,* created by 2-Bit Software of Del Mar, California, you are faced with typically impossible household situations: a pot is boiling, the phone is ringing, the baby is crying—and you've got to cope with each crisis while trying to get to the bathroom.

The appropriately named *Mad Dash* is one of four games that 2-Bit has packed under the title "Working Mother's Dilemma." The others are *Carfool,* which requires you to run all over town with little gas in your car; *Shopping Mall,* where you must find your car in a parking lot maze; and *Harried Housewife,* which has you handling cleaning, working, and a seemingly endless list of chores. The payoff for high scorers in these games is a video hot bath and a nap. Wouldn't it be more appropriate if the top housekeeper-scorer received a home robot, instead?



GLOVE STORY



The Videomax is one more gimmicky item thumbing a ride on the computer game highway. This $6.95 leather glove is designed to protect an arcade game player's hands from gruesome joystick blisters and/or calluses. But, since the glove looks like the paw of a three-toed sloth, it doesn't seem far-fetched to predict that the response of game players will be solidly thumbs down.

RUN, IT SAID

First, we had Walkman to stroll with. Now, we have Coach to jog with. Coach is a three-ounce biocomputer that records your heart rate, the number of calories you're burning, and the distance, number of steps and speed you travel while jogging. Once Coach is programmed with your vital statistics (sex, weight, stride, etc.) you put on its chest strap and start running. The strap's electrode monitors your body and sends the information back to the biocomputer.

Of course, no self-respecting coach could stand on the sidelines silently. This Coach beeps out the rate at which your feet should hit the ground to cover the distance you want in the time you want. And, if you feel exhausted, you can always chew out the beeping coach who set the pace.

(Continued on page 61)

User Views

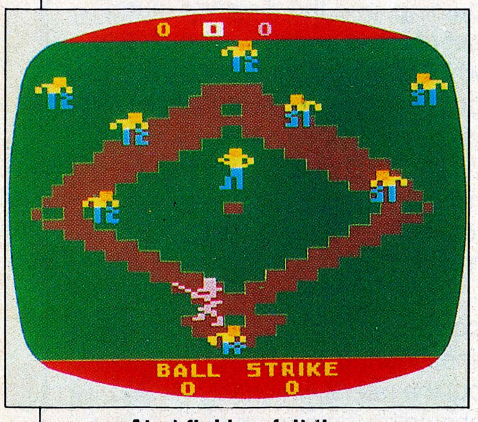
Sports cartridges have been a staple of video game systems for years. In fact, the game that started the whole video game industry rolling was that bouncing-blip-type tennis game called Pong. *We thought we'd check in and see how well some of the latest sports cartridge games succeed in making you feel like you're down on the field. We tested games that play on Atari's 2600 and 5200 systems, ColecoVision, and Atari's 400, 800 and 1200 computers.*

REALSPORTS BASEBALL

(Atari, 2600, $29.95)

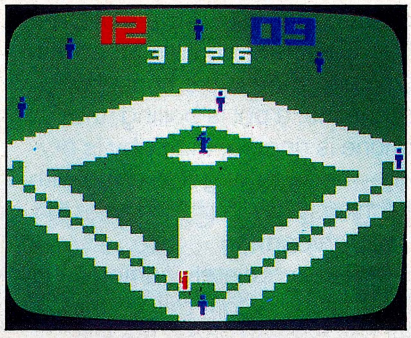
SUPER CHALLENGE BASEBALL

(Mattel, 2600, $20.00)



Atari fields a full line-up...

"Both ballparks are still graphically crude, with unexciting perspectives from behind home plate."
—Bernie



...but Mattel's short a shortstop.

"Atari's game is more complicated to learn, but you can play by yourself; Mattel's requires two players."—Phil

We don't really have a favorite between these two new cartridges. Each one has advantages over the other. *Realsports*, for instance, contains a variation that allows one player to compete against the computer (though it is not a very exciting opponent). On the other hand, *Super Challenge Baseball* offers more varied offensive action.

Both games give the pitcher a variety of options. However, the Atari game makes it difficult to distinguish between different kinds of pitches. A sinking curve looks just like a fastball. A strike looks like a ball. So when you *do* connect, it seems more a matter of luck than skill. It may be due to the complex batting set-up: you have to press the hit button *and* flick the joystick in the direction you want the ball to travel at the same time. Supposedly, this will allow a player to hit the ball to any part of the field, but we find the complication more confusing than helpful. Batting is much simpler in Mattel's game, although the graphics are blockier and the fielding team has no shortstop!

WRAP-UP

PHIL: The best feature of Atari's *Realsports* strategy is that you can hit both fly balls and grounders. Atari's game is more complicated than Mattel's. *Super Challenge Baseball* will probably have more appeal for younger players or those who want to just step up to bat without reading the rules.

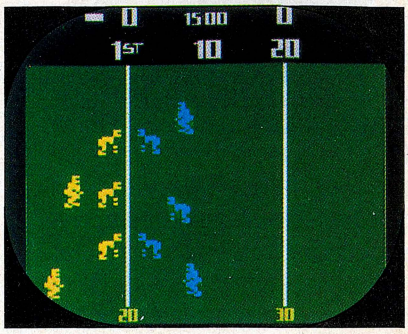
BERNIE: These games are better than anything we've had on the Atari 2600, but they are missing key elements. You can't control a ball after it's pitched, and there is no real relationship between the bat and the ball.

REALSPORTS FOOTBALL

(Atari, 2600, $29.95)

SUPERCHALLENGE FOOTBALL

(Mattel, 2600, $20.00)



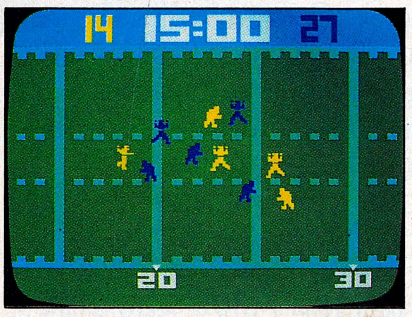
Atari 2600 football looks good...

VIDEO SPORTS SPECTACULAR

BY PHIL WISWELL AND BERNIE DEKOVEN

"I like the individually programmed players in Mattel's game."—Bernie
"But to get that, you sacrifice realism."—Phil

The complex strategies of real football are the result of having 22 players on the field. Both of these versions use just five-man teams, so don't expect them to be as faithful to their sport as the baseball cartridge games. Still, we found them more fun to play than video baseball.



...but Mattel teams play tougher...

As with baseball, Atari's game includes a one-player version, but again we found the computer disappointingly easy to beat. You can call the same blitzing play on defense every time and hold the computer to a very low score. Of course, we realize it's difficult to write a game-machine computer program for a sports team because there are so many options to cover—but if that is so, why offer such a boring option?

Game characters are sharper and more detailed in the *Realsports* cartridges than in Mattel's, but we found this didn't make too much difference. We discovered that much deeper and more satisfying mental strategy was required by *Super Challenge Football*. Atari gives you just six offensive play formations and four defensive formations to select before the ball is snapped. Mattel, by contrast, allows the captain of each team (the man under your control) to program how each of the four linemen will move. On offense, a man can go out for a pass, fake a pass pattern, or block straight ahead, upscreen, or downscreen. This allows you to create many different possibilities, such as sneaky, intricate trap plays. But don't forget—the defense has similar control over his players.

WRAP-UP

BERNIE: Nothing is used to designate the player under your control in Mattel's game, but Atari's uses a flickering character so you always know who you are. I like that.

PHIL: That didn't matter to me. I get mad on offense in *Super Challenge Football* because if I leave a defensive player in the dust he can exit the screen heading the wrong way and reappear in front of me! That's dumb.

REALSPORTS FOOTBALL

(Atari, 5200, $31.95)

"The richest game of video football I've seen."—Bernie
"Good selection of plays, but only six men to a team."—Phil

It's incredible sometimes how a game with one name can be totally different on two different machines. In this case, *5200 Realsports Football* leaves the 2600 version in the dust. If you don't mind studying rules, don't miss this new cartridge. Be forewarned, though—because you get a lengthy rule book and two play books, one for the visitors and one for the home team, each illustrating 18 offensive and six defensive formations you can call.

...and 5200 beats them both.

After a while, one realizes that this is a passing contest, not a running game. Your run options will most often yield short yardage. Touchdowns come from well-timed passes. But the art of passing is very difficult to learn in this game.

Of course, a pass must be tossed along a reasonable collision course with the intended receiver, but the quarterback must also have a clear line of sight. Otherwise, you'll get intercepted.

The two-player version is most exciting, though the game is easiest to learn in the one-player practice mode, where you square off against the computer. The biggest problem with the game is that

(Continued on page 62)

Look what we have in store for your Atari.

Arti Haroutunian has done it again.

The mind behind our first Atari® success, *Kid Grid,* has just dreamed up another one: *Juice!*

And if you don't think that's electrifying, consider what the experts are saying.

Electronic Fun with Computers and Games says that *Kid Grid* "may sound like kid stuff, but it isn't. Even on the slowest setting ...the game is quick enough to challenge almost anyone."

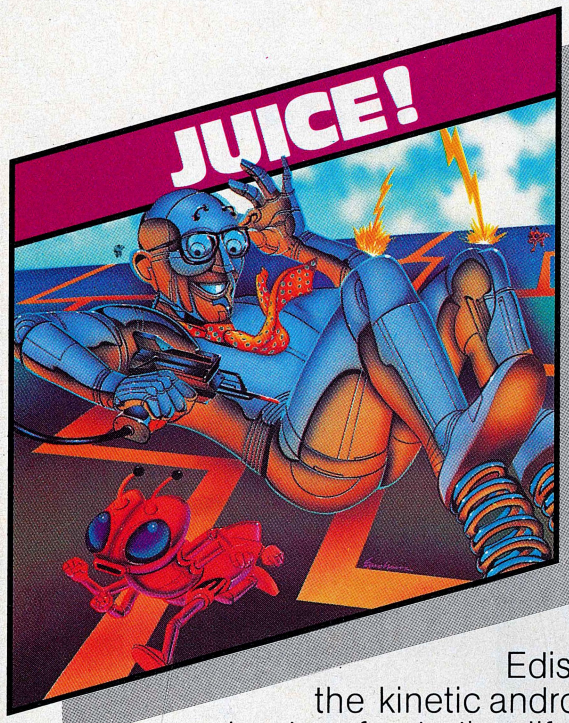
That's right. And that's not all.

Electronic Games calls the Kid "Hypnotic, appealing, fast-moving arcade action of the highest calibre, ...one of the most compulsive, utterly addictive contests in the world of computer gaming."

We couldn't agree more.

What will the critics say about *Juice!*? Will they like its colorful graphics, superior sound effects, charming characters and challenging play patterns?

Why wait around to find out?



Edison, the kinetic android, leads a frustrating life.

All he wants to do is build his circuit boards and go with the flow. But things keep getting in the way.

Nohms—a negative influence—bug him constantly. Flash, the lightning dolt, disconnects everything in his path.

And the cunning Killerwatt is out to fry poor Edison's brains.

You'll get a charge out of this one. And a few jolts, too!

(Requires 32K memory. Suggested retail $29.95)

Connecting the dots on our colorful grid should be easy, right?

Wrong. Because the bullies are in hot pursuit!

Squashface, Thuggy, Muggy and Moose are their names. And *you* are their game. And what's more, they're faster than you are.

But you're smarter. And you control the stun button.

So keep your eyes peeled for the mysterious question mark and don't slow down at corners!

(Suggested retail: $29.95)

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Available on diskette or cassette for your Atari 400, 800 or 1200 computer.

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KEEPER OF THE KEYBOARDS

BY MAX WEISSMAN

How would you like to be in charge of a computer with seven terminals, two printers, and a hard disk drive?

I am. No, my parents aren't billionaires. No, they don't own a computer store, either (though I wish they did).

I'm one of the managers of the computer room at my school—the Collegiate School in New York City. I spend an hour a day programming and helping younger kids and teachers learn how to use the computer. I also help watch over the computer room, making sure that no one does anything silly or destructive.

How did I get to be a manager? For two years, I spent hour after hour in the computer room, writing programs, playing games, and fooling around. It was not until the end of eighth grade that Mr. Sprecher, the head of the computer room, decided that I knew enough to become a manager.

There are about 20 student managers. The whole school relies on us to keep the computer room open and working. Most of the time the Collegiate computer room is run only by students like me, with no grownups present.

One of the things I like about working as manager is the teaching I get to do. Teaching younger kids is pretty easy. Showing our school's teachers how to use the computer, however, is a lot harder. Teachers are often so ignorant about computers they don't even know how to turn on a terminal!

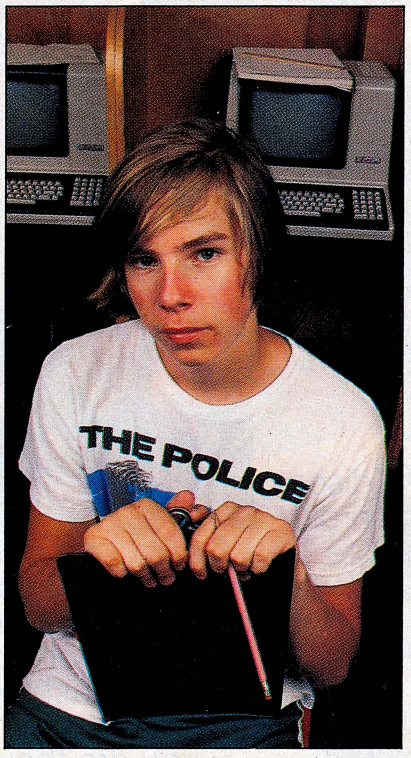


PHOTO © DEBORAH FEINGOLD

Max polices his school computer.

Preventing the Dreaded 'Crash'

One of the most difficult jobs every manager has to face is keeping people from crashing the system. When the system crashes, the computer dies—everything stops and it takes 15 minutes or longer to bring it back up. A crash of the computer is a real problem. It erases everything that has not been transferred to the computer's permanent memory on the hard disk. Suppose you're doing your homework when the system crashes. You lose everything—and that's maddening.

Kids and teachers crash the system by accident, by asking the computer to do something it doesn't understand—computers get mixed up, just like people. But sometimes kids crash the system on purpose. Some kids think that crashing the system while people are working on it is funny. They write programs which intentionally confuse the computer. If someone is caught doing this, he may be barred from the computer room until the end of the year.

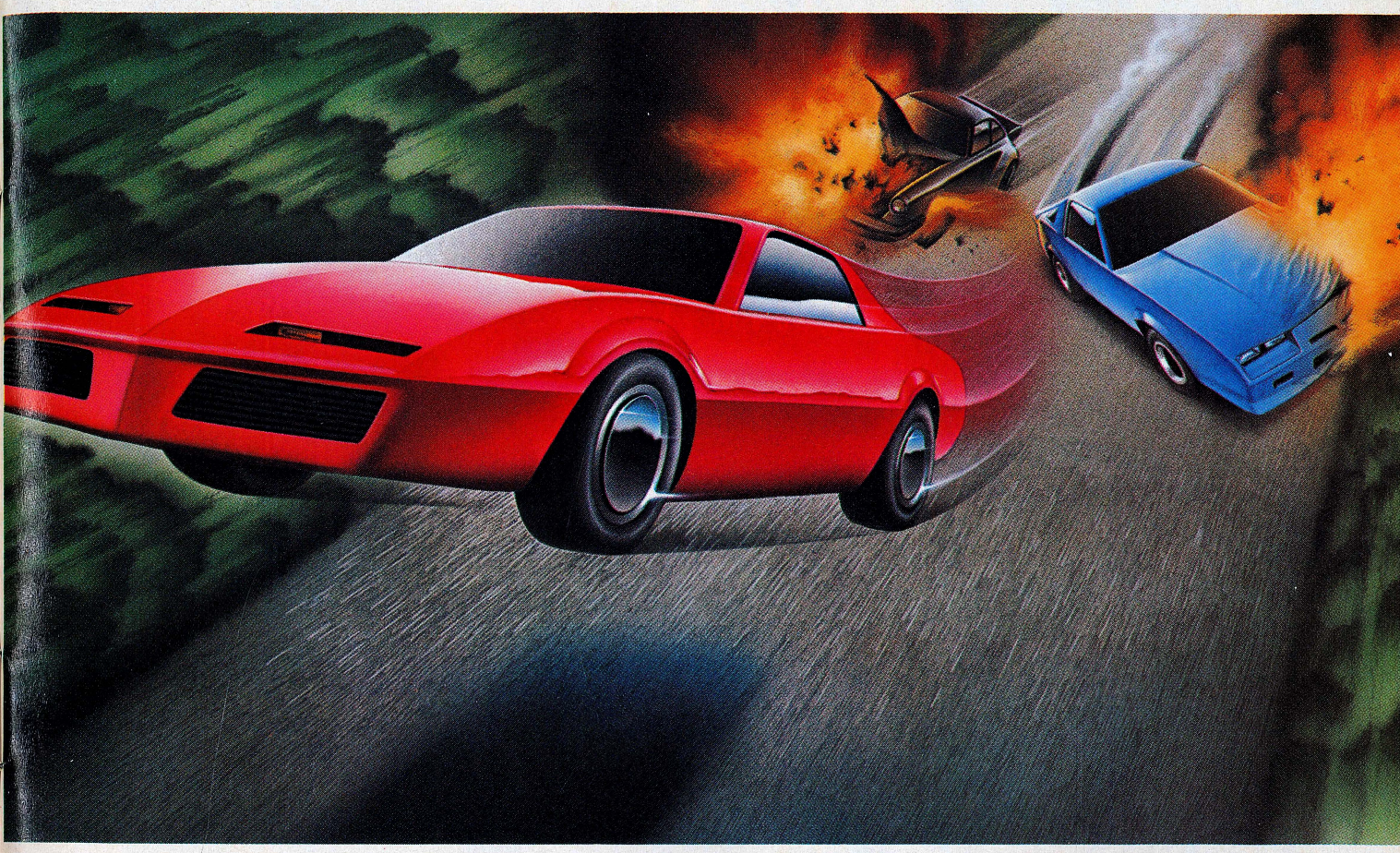
When I took the job as manager, I thought about using my power for evil purposes—like erasing other kid's storage areas or laying booby traps that would wipe out unsuspecting teachers' programs. But, once I got the job, things seemed different. I changed. I found myself stopping other students from doing what I used to do—goofing around on the computer. It wasn't just because I had to do that as part of my job. It was also because I thought what they were doing was unfair to others who wanted to use the computer room.

I have to admit it feels a little odd, going from ordinary student to a manager who has to watch what other students do. But, on the whole, I like it. For instance, my programming has gotten a lot better and more serious, because of the time I've been able to spend in the computer room.

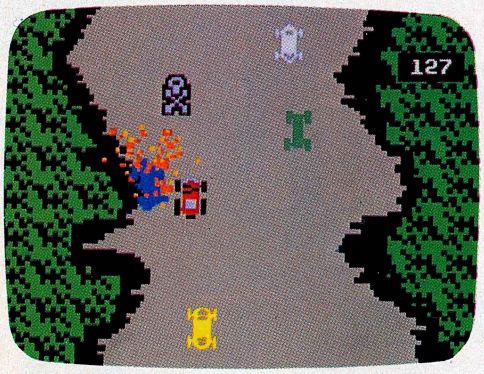
But, being in charge of the room does have its drawbacks. You see, some sneaky students just erased all my files in the computer. Very funny, guys, very funny.

MAX WEISSMAN, 16 years old, lives in New York City.

BUMP 'N' JUMP.™* THE VIDEO GAME FOR PEOPLE WHO SHOULDN'T BE ALLOWED TO DRIVE.



For those of you who spend more time crashing than you do driving, we'd like to introduce Bump'N'Jump. The home video game where it's not just okay to hit the other cars, it's required.



Shown on Intellivision. Game varies by system.

Your job is to crash as many cars as you can without crashing yourself. And to help you do it, you're given some unusual options. Not only can you bump them off the road, you can jump over what you can't bump.

But even with these advantages, you're not on easy street. Because waiting somewhere down the road might be the deadly dump trucks. Or the treacherous tanks. Or the sinister death car. When you play Bump'N'Jump, you just never know who you'll run into.

Coming soon for Intellivision® and Atari® 2600.

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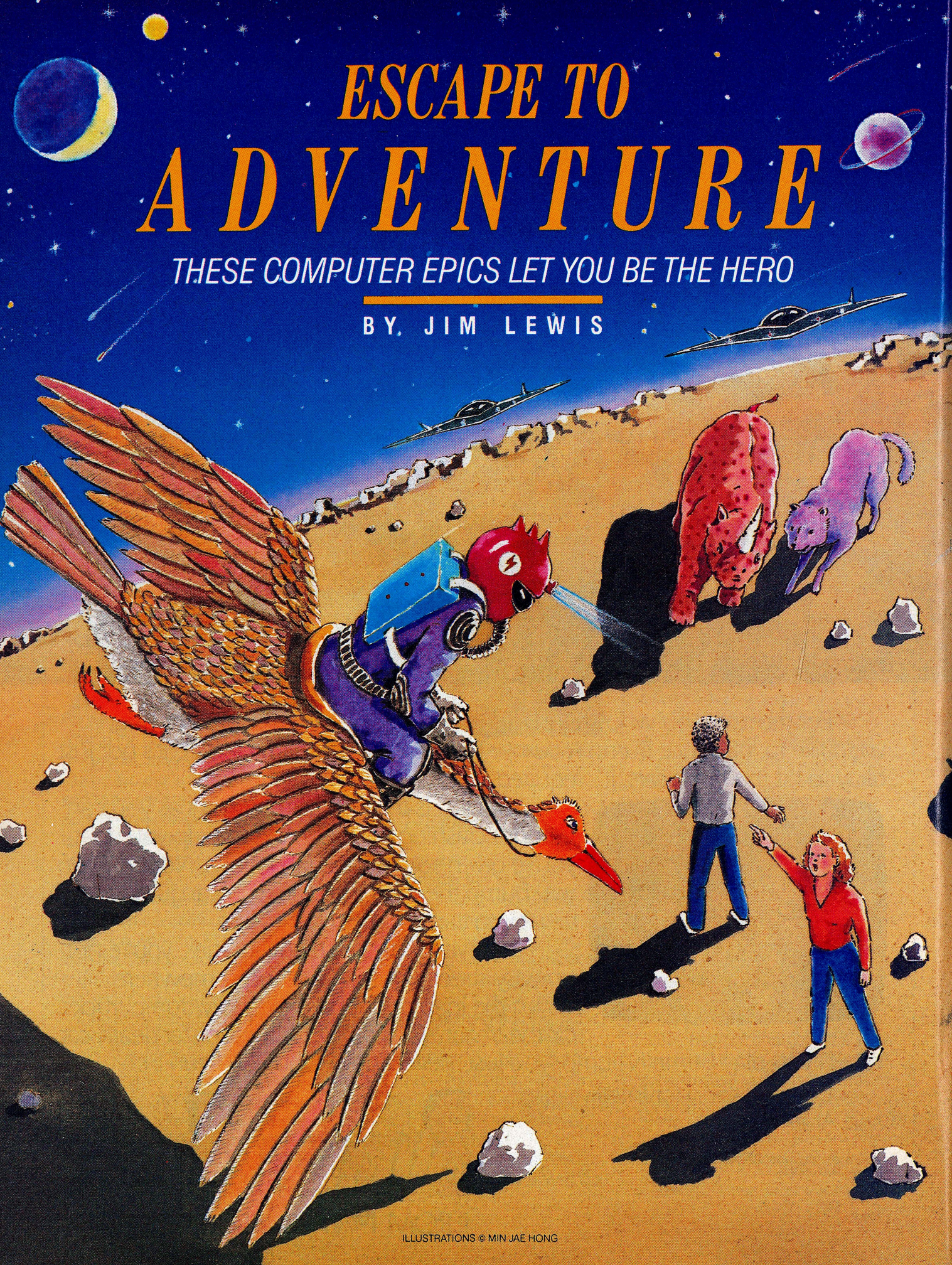
Bump'n'Jump™*

FROM MATTEL ELECTRONICS®

ESCAPE TO ADVENTURE

THESE COMPUTER EPICS LET YOU BE THE HERO

BY JIM LEWIS



ILLUSTRATIONS © MIN JAE HONG

HOWWWWWWL! Yikes! You leap up, smacking your head against the ceiling in an eerie, empty space station. You thought you were alone, but someone—or something—made that sound. Drog must be here. Drog, the evil warlord who wants to enslave your planet, is on board. You must find him and stop him—fast.

You move down the corridor, looking for Drog. In one hand you hold a slingshot and in the other, a bag of intergalactic marbles. Step-by-dangerous-step you enter the octagonal control room. The door disappears behind you. In a flash, Drog appears waving his laser broadsword. Before you can load the slingshot, Drog lunges at you...Are you doomed?

"Toss marbles on floor," you type on the microcomputer keyboard. An instant later the word "Thud!" appears on the screen, letting you know that Drog has fallen on the marbles. For the moment, you and your planet are safe...but your adventure has just begun.

ESCAPE TO

BRAVE NEW WORLDS

Tales of adventure have excited human imaginations since the first cave storyteller praised the hero of the hunt. From the Trojan Wars to *Star Wars*, tales of risk and bravery have taken us to exotic places and shown us great heroes and heroines in action. But the story was always locked into pages or pictures. We could look into the world shown there, but we could never join in the fun, whether the location was Sherwood Forest or the surface of the moon.

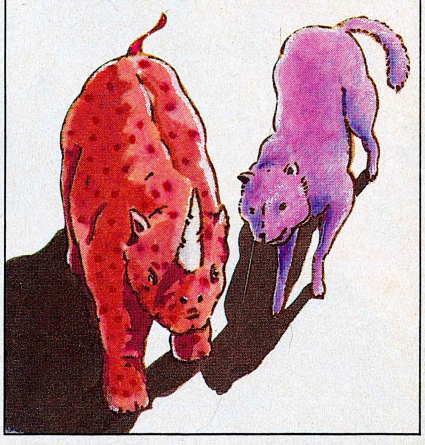
Computer adventure games have changed all that. Now, through the keyboard of a microcomputer, you can play an active part in wide-ranging adventures, controlling your destiny through hundreds of complex predicaments. Using words and pictures to describe vivid adventure settings, the computer can put you aboard an empty space station, in a prehistoric cave, or on any real or imagined world. Confronted there by knee-knocking challenges, you must be incredibly clever and stunningly brave to survive and emerge victorious. The fate of the world doesn't depend on some character in a story—it depends on *you*. And, if you slip up, you—not a make-believe figure—will fall in the bottomless pit.

"Mind-boggling" is how 13-year-old adventure gamer Brendan McLaughlin describes this experience. "You really feel like you're part of the story...When you get into a tight situation, you have to figure the way out."

The power of becoming a hero in your very own universe has proven so exciting that "adventuring" has become incredibly popular. Six years ago, the only computer adventure was an enormous game called *Colossal Cave*. Designed in the mid-1970s by computer science students at Stanford University, this game could only be played on massive mainframe computers. Then, in 1978, computer technician Scott Adams programmed an adventure similar to *Colossal Cave* for his personal computer, a TRS-80. This game—*Adventureland*—was the first adventure for microcomputers. Today, hundreds of varied and complex adventures are available for almost every kind of home computer.

As adventure games have spread over personal computerdom, hundreds of thousands of people have risen to the challenge of conquering them. Their search for adventure has turned a pastime once reserved for hackers into a full-blown home computer craze—and created a subculture of people who live at least part of their lives as heroes in other worlds.

"Adventure games can put you in an empty space station, a prehistoric cave, or any real or imagined world."



TIME TRAVEL

In the universe of computer adventures, few worlds are as complex and convincing as that of *Time Zone*. This "micro-epic" from Sierra On-Line is so elaborate and detailed that programmers had to use both sides of six floppy disks to capture all its complexities.

In *Time Zone*, the adventurer has been chosen to save Earth from

ICE PIRATES

(Game begins on page 4)

On board the ship and still invisible, you stalk about looking for clues. There's a motor in the engine room and a kitchen in the galley, but nothing else unusual or helpful. Then you discover the captain's office. It is empty except for a barrel, a box and a desk. You read the ship's log, which is sitting on the desk. What luck! The crew has finished its patrol and is headed back to Glich's secret lair. Just as you are about to leave, the cold-hearted captain and first mate enter. Your magic is wearing off. In a second you will be a visible and easy target. There is no time to grab the saber or drink more potion. You must hide.

If you choose to hide in the barrel, go to page 47. If you choose the box, go to page 50.

alien invaders from the planet Neburon. A player must travel through 39 separate but interconnected scenarios—spread across seven continents and over nine different historical periods—to successfully complete the mission. The adventurer must journey to ancient Rome, Antarctica, Sherwood Forest and dozens of other times and places. Each scene holds new challenges—quicksand, monsters, wild beasts. It can take a player from six months to a year to overcome all these obstacles and complete the adventure, according to its designer, Roberta Williams.

"It's an enormous challenge," admits Williams, who spent several months designing and writing the game. In fact, Williams, who also wrote the first computer adventure with graphics (*Mystery House*) and the first with color graphics (*The Wizard and the Princess*), was worried that *Time Zone* was so complicated no one would solve it. So, she had Sierra On-Line set up a telephone help line for *Time Zone* players. Adventurers who are waist deep in a sinkhole or cornered by a woolly mammoth can call Sierra On-Line at 209-683-6858 and talk about their dilemma with game makers.

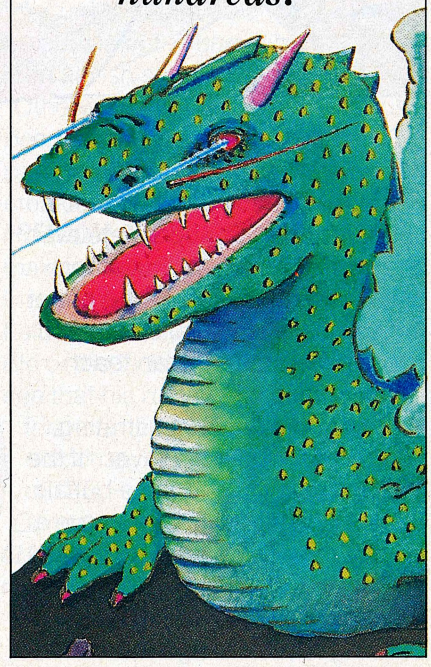
More than 1800 *Time Zone* fans, however, have chosen a different form of help. They have banded together to form the Vault of Ages, a national telephone-connected computer network dedicated to *Time Zone*. The Vault exists within the mainframe computer of The Source, a telecomputing company. Using a modem—a device that enables computers to "talk" with each other over telephone lines—subscribers to The Source can enter the Vault's files and can exchange information about *Time Zone* through their computer terminals.

"It's a national solving club that lets people playing *Time Zone* get hints, get answers and contribute new information about the game," explains Roe Adams III, the Vault's founder and its curator. He holds the distinction of being the first person to complete the *Time Zone* adventure—a feat he managed just seven days after the game was introduced.

Adams rewards those who contribute new information about *Time Zone* to the Vault by placing their names on an honor roll of master solvers. But for some *Time Zone* players, the Vault of Ages offers an even greater reward.

Frank Jimenez, 15, of Richardson, Texas, says: "It just makes you feel good to help someone get past a problem you've already solved."

"Six years ago, there was only one computer adventure, called Colossal Cave. Today, there are hundreds."



MIND IMAGES

Time Zone is an example of a Hi-Res (for high-resolution graphic) adventure. This type of adventure game features pictures that complement text description of the adventurer's predicament. The first Hi-Res games had simple line drawings, but more recent games like *The Dark Crystal* (based on the Jim Henson movie) include sophisticated, multi-color pictures. A game called *Mask of the Sun* from Ultra-Soft even features graphics that give the illusion of animation.

These Hi-Res games dominate the computer adventure world right now, but some players and game makers still prefer the pleasures of all-text adventures.

"I like the text games better because you can imagine what something looks like," says George Arfkin, 14, from Signal Mountain, Tennessee.

Mike Berlyn, senior designer with the Cambridge-based game company Infocom, which produces only all-text games (including such popular adventures as *Witness*, *Suspended*, and *Zork I*, *II*, and *III*), agrees. "We're interested in creating a total reality, an other-worldliness," explains Berlyn. "We feel we can do that better with words than with the current state of computer graphics. We don't use graphics for the same

reason most books don't have illustrations...you can create a better picture in your own mind."

Infocom's game makers handle words very well. While most current computer adventure games demand that you type in simple two-word commands, Infocom games allow you to communicate in complete sentences. This makes you feel as if you are actually talking with the computer.

"Our idea is to make the computer as invisible as possible, to make you feel like you are *in* the adventure world," says Berlyn. "If you spend all your time trying to guess which two-word command the computer will accept, you lose that sense of active participation."

CAST OF THOUSANDS

Text and Hi-Res adventures give players enormous control over their characters' fates as they struggle through the land of Rungistan, the planet Zork or other adventurous domains. But only one kind of adventure actually lets players create their characters from scratch. In these adventures, known as "fantasy role-playing," *you* choose the distinct traits you want the character to have—intelligence, agility, vitality and luck. Then you get to see how these traits serve your character.

The most popular computer fantasy role-playing adventure is *Wizardry*, produced by Sir-Tech. In this game, you have to maneuver your home-grown band of Samurai, Ninjas, Sorcerers and Thieves past hundreds of obstacles and through a 10-level, 3-D maze. Up to six people can play this adventure together, each creating and controlling a character: wielding swords, casting spells and trying to stay alive.

"Adventurers who are waist-deep in a sinkhole or cornered by a wooly mammoth can get help—by calling a phone number."

Some players complain that the *Wizardry* challenge is too great—you face so many dangers that it can take months to complete even one level of the maze. But others believe this challenge—the power the game gives you to create and control characters—can teach valuable lessons.

"The game can be frustrating," admits one *Wizardry* player. "If the snake doesn't get you, the buffalo does. But after a while you have a list of what's coming up and you're able to prepare yourself (and your characters)...You're essentially building a list of things you want to avoid. It's a lot like growing up."

In just five years, microcomputer adventures have extensively explored the maze of Hi-Res, text and fantasy role-playing games. But the future holds still more intricate twists and turns for adventure games.

"Adventures will become more complex as computer memories improve and can store more information," says Scott Adams, the computer adventure pioneer who is now the president of Adventure International, Inc., a game company. Adams predicts that expanded computer memory will give the games more vivid graphics and more advanced animation.

"There will also be more real time action and more role-playing adventures where several players play at once," predicts Chris Cerf, computer expert and editor of Sierra On-Line's *Dark Crystal* adventure game.

Cerf also suggests that soon microcomputers will be linked with video disc players, creating future adventure games featuring live action motion picture scenes. You could be a movie star in your own adventure world!

In fact, as adventure worlds become more convincing, you just might begin to believe that the evil warlord Drog actually is chasing you around an abandoned space station. Of course, we all know that it's just a game...Vazoooph!...Look out! Here comes Drog with that laser broadsword. And boy, is he mad! YEEEEEEEOOOOOW!!!

Which are the best adventure games available? For one player's choices, turn to "Best of the Quests" on page 39.

JIM LEWIS is an associate editor of ENTER Magazine.

A WORLD OF YOUR OWN:

How to Create an Adventure Universe

Imagination is at the heart of any great adventure. It can transport you to the planet Mondo, catapult you into the court of Queen Cleopatra or make you captain of a spaceship city. When you play an adventure game, you enter the game designer's imagination.

When you get tired of adventuring in other people's universes, you may want to try to make your own adventure game. Remember that an adventure is like a maze: there are many paths to follow, but only a few will take you where you want to go. Begin by making a list of places where players can travel and what decisions they will have to make. Decide what tasks must be done and what tools will be needed.

You can build your own adventure game universe with a pencil and paper—like a board game—if you don't have access to a computer. And if you do have a computer, but don't know how to program yet, you can try a make-your-own-adventure disk called *Genesis* from Hexcraft, Inc. (P.O. Box 39, Cambridge, MA 02238).

To help you get started with your adventure, ENTER asked some of the country's top adventure game experts what features exciting adventures include. They suggested:

THRILLING HEROES AND HEROINES: Invent a Wizard Princess or a Juggling Magician companion for your players. "When a person gets into the game, he becomes a character in the adventure. It's important to have heroes that your players can identify with," says Tom Snyder, creator of *In Search of the Most Amazing Things* for Spinnaker.

CHILLING VILLAINS: Unleash a hive of mutant bees or a monster the size of Wyoming. Make your villain scary or silly, but always unpredictable. "The hero and heroine should have to stay alert every moment," says Roberta Williams, designer of *Dark Crystal* and *Time Zone*.

LAW AND ORDER: Your universe doesn't have to have police officers, but it should have rules that govern what *can* and *cannot* happen in your adventure. If you ask a fish a question, can it answer? It can, if you made a rule that fish in your universe are able to talk. But be consistent. If one fish can talk, then all fish should be able to talk. "Otherwise, (the adventure) will just become a series of random happenings." explains Mike Berlyn, creator of the game *Suspended*.

FREEDOM OF CHOICE: Let players make plenty of decisions. Should they travel up the stairs or down the hallway? Should they bring the candle or the ladder? "A player should see that his decision makes a difference, that an action has an outcome," says Penny Petticord of TSR Hobbies, Inc., makers of *Dungeons & Dragons*.

CLUES: Challenge players with mind-boggling riddles and dynamic dilemmas in your adventure, but give them a logical way to solve every problem. If the solution is too difficult, the adventure becomes a mere guessing game. "Don't make it simple, but do give hints," explains Hexcraft's Brad Prichett.

SURPRISE!: "There should be something unexpected around every corner," says Designer Scott Adams. If a lion may lurk behind any tree, players will pay attention.

THE END: Even great adventures must end. But they should end with a bang, not a whimper. "When players make it through the adventure, they should feel they have accomplished something," says adventure game champion Roe Adams III. Let the players add their names to a list of great adventurers, or reward them with a flashing computer screen. Let them know that —for now—their adventure is over.

ICE PIRATES

(Game begins on page 4)

Glich is not beaten. In a few moments, the enchanted ice maker will start. To keep you at bay, Glich attacks with a dozen ice dragons, two icy vines and 23 snowball throwers. You easily handle most of this onslaught, but you cannot cut the vines. Glich is about to flick the switch and conquer the computer world. You must swing by one of the vines—either the red or the white one—and knock the ice-maker from Glich's grasp.

If you choose the white vine, go to page 53. If you chose the red vine, go to page 64.

Digital

PHOTO © N. RODGER

Dancing

COMPUTERS ARE ADDING COLOR TO THE WORLD OF DANCE

BY SUSAN MEYERS

Picture a theater. The lights are dim. The auditorium is filled with people. There is a large screen onstage, with a video camera to one side of it. Two teenage boys sit in the auditorium pit. One is playing a synthesizer, the other has his hands poised above a computer keyboard. A dancer appears onstage, in front of the screen. He begins to move in time to the music, with the video camera recording his movements.

The boy at the computer presses the keys. Suddenly, a pattern of dots appears on the screen behind the dancer. The dots begin to move, change, merge. All at once, the dots turn into an image of the dancer.

Then, as the boy at the computer types on the keyboard, the image begins to change. It divides and comes back together. The dancer is moving, but the images stay on the screen even after he has passed. All his movements are present on the screen, one on top of the other. The image turns into a series of abstract patterns. Colors appear, disappear, merge, and then burst like a rainbow exploding.

This scene, which was part of the TV show *Fame* last year, is one of the exciting examples of how dance and computers are being combined to create new art forms. But computers aren't just changing the way dancers and dance look. They are also creating a whole new way of training dancers, and opening the door to a new system of saving the great dances and ballets of the past.

Ed Tannenbaum's Chroma-chron system uses computers and a video camera to create moving waves of color.

Digital

COMPUTER GRAPHICS

The episode of *Fame* that featured computer-graphics was called "Blood, Sweat and Circuits." In it, the school's technophobic English teacher challenged her students to prove that computers could create art. In a few weeks, the students put their system together and then presented a dazzling show.

This system really does exist, but it didn't come together in a few weeks. In fact, "Chroma-chron," as it is called, took its inventor, Ed Tannenbaum, more than four years to perfect. Ed created all the hardware, wrote all the programming, and is still the only person who knows how to operate the system. Without Ed Tannenbaum, "Chroma-chron" couldn't exist. In the *Fame* episode, the young actor (David Greenlee) who was hitting the keys was only pretending; Ed Tannenbaum was really producing all the images backstage. (For an explanation of how Chroma-chron works, see the box on the next page.)

Tannenbaum, who is 30 years old, didn't start out as a computer buff. He was an artist, a painter. Ed went to college at the Rhode Island School of Design, and received a degree in Fine Arts. But he had always been interested in electronics as a kid, and while at Rhode Island he had studied video art. "In painting, I was always interested in movement," he remembers. "Then, someone showed me a personal computer. I knew it was just what I had been looking for." Soon Ed had abandoned brushes and canvas to paint video images with his computer.

Ed Tannenbaum has worked with a number of dance companies and helped them use Chroma-chron in performance. He has also installed pre-programmed Chroma-chron systems in museums and amusement centers. If you go to the Exploratorium in San Francisco (where Tannenbaum has been artist-in-residence for several years) or Sesame Place in Dallas, Texas, or Langhorne, Pennsylvania, you will see his handiwork. When you enter these exhibits, you can step in front of the video camera and see yourself transformed into a computer-animated image!

PHOTO © DICK ZIMMERMAN

...freeing dance from dependence on memory or complicated notation.

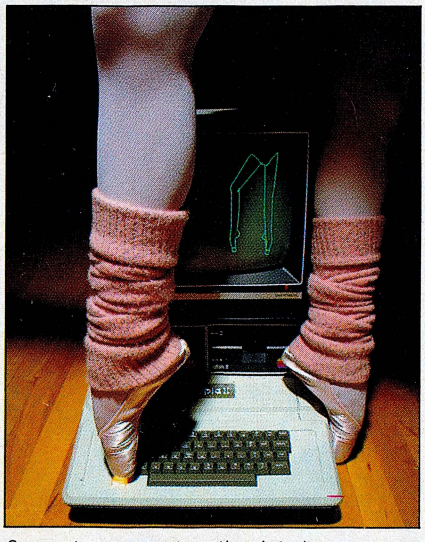


PHOTO © DICK ZIMMERMAN

Computers convert motion into images...

Dancing

DANCING COMPUTERS

Chroma-chron dance video is a new art form that represents what dance may look like someday. But computers won't have to wait until tomorrow to have a significant impact on dance. Dance schools today use computers to solve artistic problems.

One major way in which computers are aiding dancers is in developing a permanent recording system for dance. Amazingly, there are no written records for most famous ballets and modern dance performances. While composers of music write down their melodies as they are invented, choreographers don't write *anything* down.

If a company wants to repeat a dance performed in the past, it *cannot* look to a written record. Instead, dancers who remember the movements are called back. The dance is then reconstructed step-by-step. Many famous dances have been lost because no one remembers how they were done.

Several systems of written dance notation exist, but they are very difficult to use. Film and video tape aren't much help, either, because

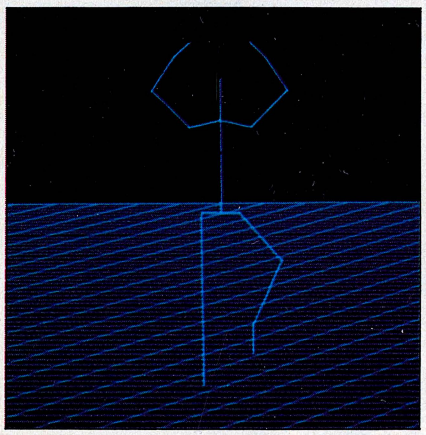


PHOTO © ALAN ZENUK

Ballerinas are thin, but computerized dancers like this training figure are even thinner.

HOW IT WORKS

CHROMA-CHRON IN ACTION

PHOTO © 1983, RASTER MASTERS

Chroma-chron captures the dancer's movement with patterns and colors.

The art produced by Chroma-chron is a blend of dance and video graphics that has never been seen before. In simple terms, what happens is this:

The image of the dancer is taken in by a black and white video camera. The camera's wave-like TV signal goes to an electronic processor. There, the wave—which represents the dancer's movement—is converted into a series of numbers a computer can understand. These numbers are stored in the processor's memory.

The processor is connected to a computer. Ed Tannenbaum, Chroma-chron's inventor, has programmed the computer using FORTH, a computer language that is more complicated and powerful than BASIC. It lets the programmer make up new rules and definitions for the computer. For this reason, FORTH is called *user-extensible*, because the user can extend what the computer understands. "It's more than a language," Tannenbaum says. "It's like a programming environment."

Using his FORTH program, Tannenbaum's computer can produce hundreds of combinations of line, shape, and shadow. Movements can be repeated or frozen. Images can be drawn using more than 4,000 colors.

The operator works on a keyboard to call up these remarkable effects and display them on a video screen. The process takes just 210 nano-seconds (a nano-second is a billionth of a second), so the dancer and his video image move simultaneously.

"That's what's so exciting about it," says Tannenbaum. "Nothing is pre-planned. It's not standard computer animation like Disney used in *Tron*. It's spontaneous. Everything's being created on the spot."—*Susan Meyers*

Digital Dancing

they record from only one angle. Background dancers are often lost.

The lack of an easily understood language of dance is a serious problem. As one choreographer puts it, "Without a written language, dance is really in the Dark Ages."

Enter the computer.

A number of experiments are underway now using computers for dance notation. The simplest technique uses the computer as a word processor. In this approach the notator watches a dance as it is performed, and types the movements she sees onto keys corresponding to symbols representing dance movements. In this way, a skilled notator can produce a score in one quarter of the time it would take by hand.

But a written score is still difficult for most dancers and choreographers to understand. A better approach might be to use computer graphics to create an animated dancer that can leap, glide, and spin across the computer screen—a kind of picture-memory of the dance. This is the path being followed by other computer scientists interested in dance.

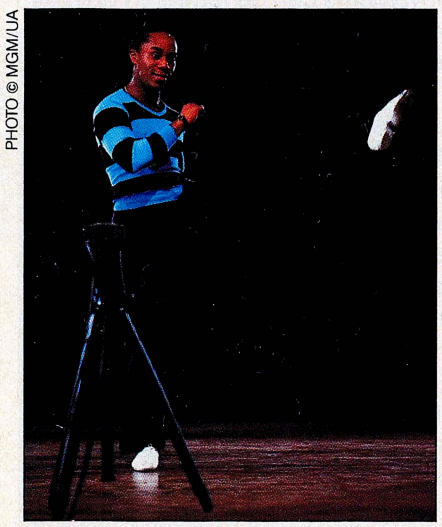


PHOTO © MGM/UA

Gene Ray danced with Chroma-chron in an episode of TV's 'Fame.'

PHOTO © ALAN ZENUK

Computer electrodes record a dancer's moves.

ANIMATION AND "BUBBLEMAN"

Edward Dormbrower, a dancer himself, has created a way of keeping dance records by using a two-dimensional animated figure. "As a dancer, I've seen the need for some form of notation that can be immediately understood," he says. "An animated figure provides that."

Two dance professors at the University of Pennsylvania have devised a more complicated system than Dormbrower's. Norman Badler and Stephen Smolier have invented a figure who looks three-dimensional. They call this dancing illusion "Bubbleman." Bubbleman has many joints and can perform a wider range of movements than Dormbrower's ballerina.

Badler and his associates first used complex dance notation symbols as the basis of their computer language. But now they've devised a set of instructions that can be given to the computer by anyone with a basic understanding of human movement. "A grant that we got from NASA to develop an animated figure for use in the space program pushed us in that direction," Badler says. "We had to find a simpler way to communicate with the figure because no one at NASA knew standard dance notation."

Badler, with this boost from the space program, now has a system that is nearly ready for use by choreographers willing to experiment in applying new technologies to their art. He has paired his Bubbleman with a Bubblewoman, complete with leotard, hair, and facial features. This *pas de deux*—Bubbleman and Bubblewoman—may one day dance their way from NASA to display screens of dance companies around the world.

Like Ed Tannenbaum's imaging process, Badler's computer notation offers the dance world exciting new possibilities for creating and preserving art in the computer age.

SUSAN MEYERS is a freelance writer in California.

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THE LIGHT FANTASTIC

HOW LASERS SAVED A YOUNG GIRL'S LIFE

BY DICK ROBINSON

Almost any day you could find her playing baseball or soccer with the neighborhood kids. Or she'd be running around her large San Diego home with Locutor, her white Samoyed dog. Maybe you'd even find her in an arcade playing *Centipede*.

Her parents, who came to this country from Mexico more than 13 years ago, were extremely proud of her. People called her "adorable and photogenic." She was a typical American teen.

But one day, Elizabeth Miramontes started getting headaches. They became so painful that she could hardly eat. Her 4-foot-10 inch body shrank from 80 to 55 pounds.

ELIZABETH'S MYSTERIOUS AILMENT

Elizabeth was afraid. She didn't know what was wrong. Her father, Rodrigo, a construction worker, and her mother, Evangelina, were worried. They took her to half a dozen doctors, including one in Tijuana, Mexico. None of the doctors knew what was wrong, either.

Finally, her problem was discovered. Elizabeth had a rare, small lump beneath her brain called Rathke's cleft cyst. The cyst, the doctors told her, would grow larger. It threatened her life.

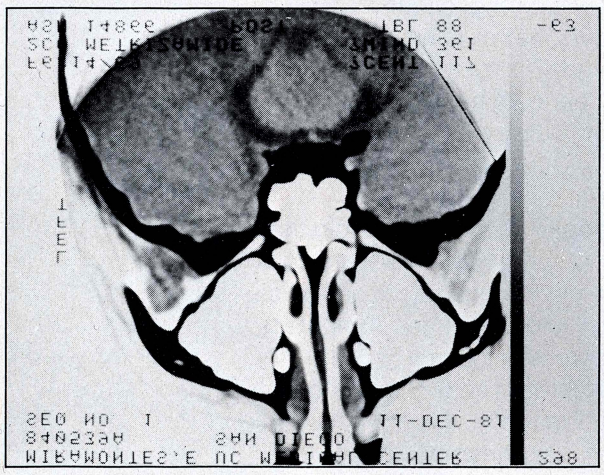
Happily, Elizabeth was told that a remarkable type of surgery could make her tumor disappear. The surgery would combine a computer's memory with the power of the brightest light known—a laser.

Until recently, surgeons have had to aim laser beams by hand, estimating the position of their target from X-rays made before surgery. But in Elizabeth's case, the laser was moved over the target by a joystick similar to those used in video games. Here's how it was done:

Dr. Hector James was the surgeon who worked on Elizabeth's case. He looked at the tumor through a microscope with a laser attached to it. A red dot of light marked where the laser would hit.

Elizabeth Miramontes can play again, thanks to the laser that saved her life.

PHOTO © HOWARD SOCHUREK



ABOVE: ***Doctors can now get a three-dimensional view inside the brain using a computerized device called the CAT scanner.***
LEFT: ***This is the CAT scan of her brain that helped Dr. James to operate on Elizabeth.***

Using a joystick, Dr. James moved the red dot over the target. Then he removed his hands from the controls—so he couldn't shake the light off target—and fired the colorless light beam with a foot pedal. In a puff of smoke, the tumor was literally turned into water.

Lasers were once only fanciful weapons of science fiction. But today these highly concentrated beams of light are actually saving lives. Neurosurgeons (surgeons who operate on the brain and nervous system) can now operate on cysts—like Elizabeth's—that they couldn't touch before. They can burn away deep tumors that are in places a surgeon's knife can't reach.

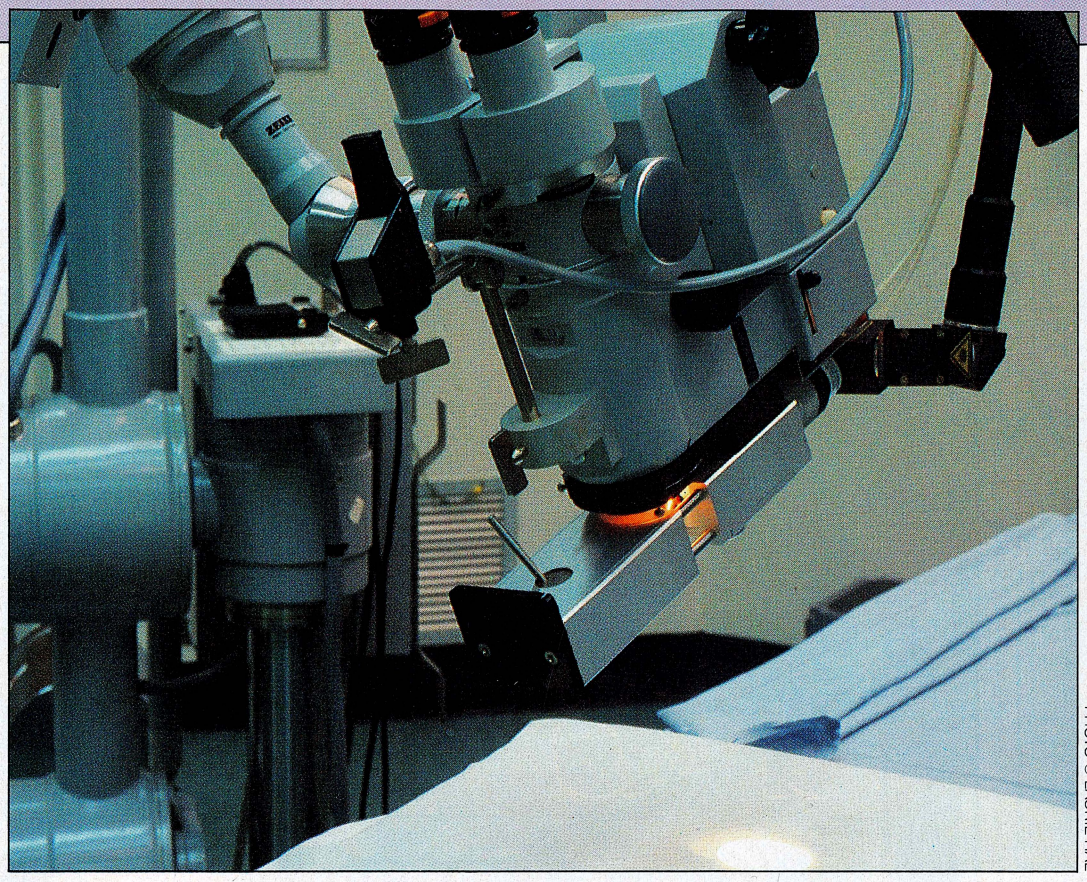
HOW COMPUTERS WORK WITH LASERS

What's more, the lasers doctors use are being made much more effective by computers. Elizabeth's problem, for instance, was found by a million-dollar machine called a CAT (*Computerized Axial Tomographic*) scanner. It is a special X-ray machine that uses a computer to make three-dimensional pictures of the inside of the body. These pictures can then be seen on a television screen or film. The technique is something like cutting an orange into slices and photographing each section.

When the CAT machine found Elizabeth's cyst, the doctors decided they had to take it out. Computers and lasers helped here, too. "What we had to do [with the laser] was destroy all the tumor, or it would come back," Dr. James explains.

Surprisingly, the laser light Dr. James used contains no more than 20 watts of power. That's less than a common light bulb. But the laser packs tremendous power, since its energy is concentrated on an area tinier than a pinpoint.

If you've ever held a magnifying glass over a dry leaf or piece of paper and let the sunlight set it on



LEFT: ***A joystick directs the life-saving beam of this laser machine. When the laser is in place, the doctor will press a foot pedal and fire the beam. In an instant, the delicate operation is over. Dr. James used this type of laser machine to perform the surgery that made Elizabeth well again.***

PHOTO © LAURIE HAL

fire, you have seen an example of the power of concentrated light. Lasers, though, work a little differently. The word laser stands for "*L*ight *A*mplification by *S*timulated *E*mission of *R*adiation." A laser is generally a glass rod filled with a gas. When shone through the gas, the light becomes a straight, colored beam. This light energy is then strengthened by bouncing it off mirrors in the rod. Finally, the light shoots out the end of the rod in a thin, concentrated line that can be focused down to 1/50th the size of a human hair.

How did the laser operation work in Elizabeth's case? "Perfectly," responds Dr. James. "She's cured." Elizabeth's mother now recalls that before the operation, "I was crying all the time. But after the surgery, I felt like jumping and screaming and hugging the doctor."

Elizabeth, now a ninth grader at Marston Junior High School, missed a whole year of school because of the illness. But she didn't miss her lessons. She was tutored by a special machine installed in her room. "I would write something on paper, and it was transmitted by phone to the tutor," she says. "Then the tutor wrote something, and I received it."

GETTING BACK TO NORMAL

Although her weight is still a bit low, Elizabeth says she's back to near normal. She's doing everything she did before her illness—just not quite as hard. "I can't run as much," she says. "I could run real fast before, and it wouldn't get me tired. But now I can't. I can only run a little bit, and I get tired. And I have to drink a lot of water." The results of her illness may make her permanently thirsty, according to Dr. James, but he feels her full strength will return in time.

To those who know her best, Elizabeth is back to her old self. "She's a bright kid," says her 19-year-old cousin, Susie Cabral. "She's fun to be with. We have fun going to the park, the movies and video games. It's just like nothing happened."

Thousands of other young people like Elizabeth—and older people, too—have been miraculously healed by painless lasers. Their uses seem endless. For example, lasers are now used for such medical tasks as sealing blood vessels during surgery and even protecting teeth against cavities.

And this, doctors say, is only the beginning. In the years ahead, lasers may allow us to create very fast computers with optical instead of electronic circuits. Lasers piped through thin fiber-optic tubes may also be used to seek out and treat illnesses anywhere in our bodies.

By then, Elizabeth may well be on the way to her dream of becoming a veterinarian—thanks to the light that heals. And what does she now think of the light that saved her life? Elizabeth answers: "It's a miracle."

DICK ROBINSON, a freelance medical writer for several national publications, is president of the Florida chapter of the American Medical Writers Association.

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THE MAVEN

A VISIT FROM A VIDEO GAME GENIUS

(With computerized apologies to Edgar Allan Poe)

BY MIKE EDELHART

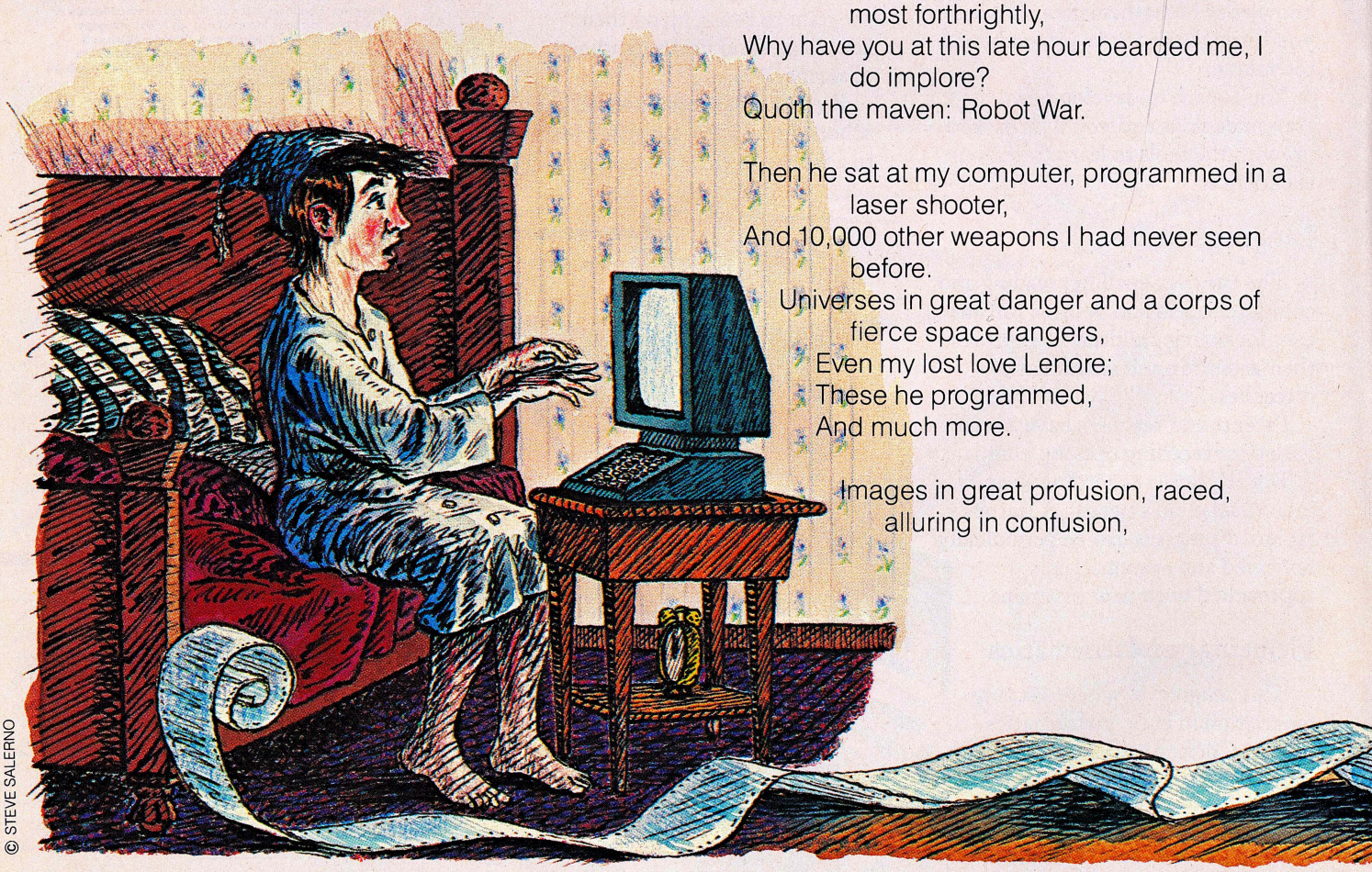
Once upon a midnight dreary,
while I pondered weak
and weary
Over many a quaint and curious
volume of computer lore,
While I nodded, nearly napping, suddenly
there came a tapping,
As of someone gently rapping, rapping at my
chamber door.
Only that and nothing more.

Up I stood and flung the shutter, when with
many a flirt and flutter
In there stepped a long-haired maven, print-
outs dragging on the floor.
Not the least obeisance made he, not a
moment stopped or stayed he,
But without the least expression leaned upon
my chamber door,
Only this and nothing more.

Tell me, sir, I asked politely, state your purpose
most forthrightly,
Why have you at this late hour bearded me, I
do implore?
Quoth the maven: Robot War.

Then he sat at my computer, programmed in a
laser shooter,
And 10,000 other weapons I had never seen
before.
Universes in great danger and a corps of
fierce space rangers,
Even my lost love Lenore;
These he programmed,
And much more.

Images in great profusion, raced,
alluring in confusion,



© STEVE SALERNO

Spent themselves and died beneath the fury of
his cosmic war.
Gazing on this rich illusion, shot my nerves a
sharp infusion
Of desire to attack and robot masses to abhor.
To steep myself in micro gore.
Quoth the maven:
Beat my score.

Thus I settled at my console, answering the
cosmic drum roll,
Pushed the joystick to do battle as 'twas never
done before.
Wild I flew, my foes sent reeling,
Straight I shot, in death sent dealing
Galaxies to Styx's shore.
All this,
But I lost the war.

All that night I warred outrageous, monitored
my dials and gauges,
Drove myself beyond endurance toward the
goal I hungered for:
Master of Galactic Carnage,
Owner of the Highest Score.
Quoth the Maven:
You need more.

Maven, cried I, most abjectly, your infernal
game has wrecked me.
Will I be a wasted figure, lusting o'er the laser's
roar?
Only this
And nothing more?

Here I sit most foul addicted to the game you
have inflicted
On my life, Oh heartless Maven, shall I ever top
thy score?
Shall I ever throw thee over, once more see my
mom and Rover?
Quoth the Maven:
Nevermore.

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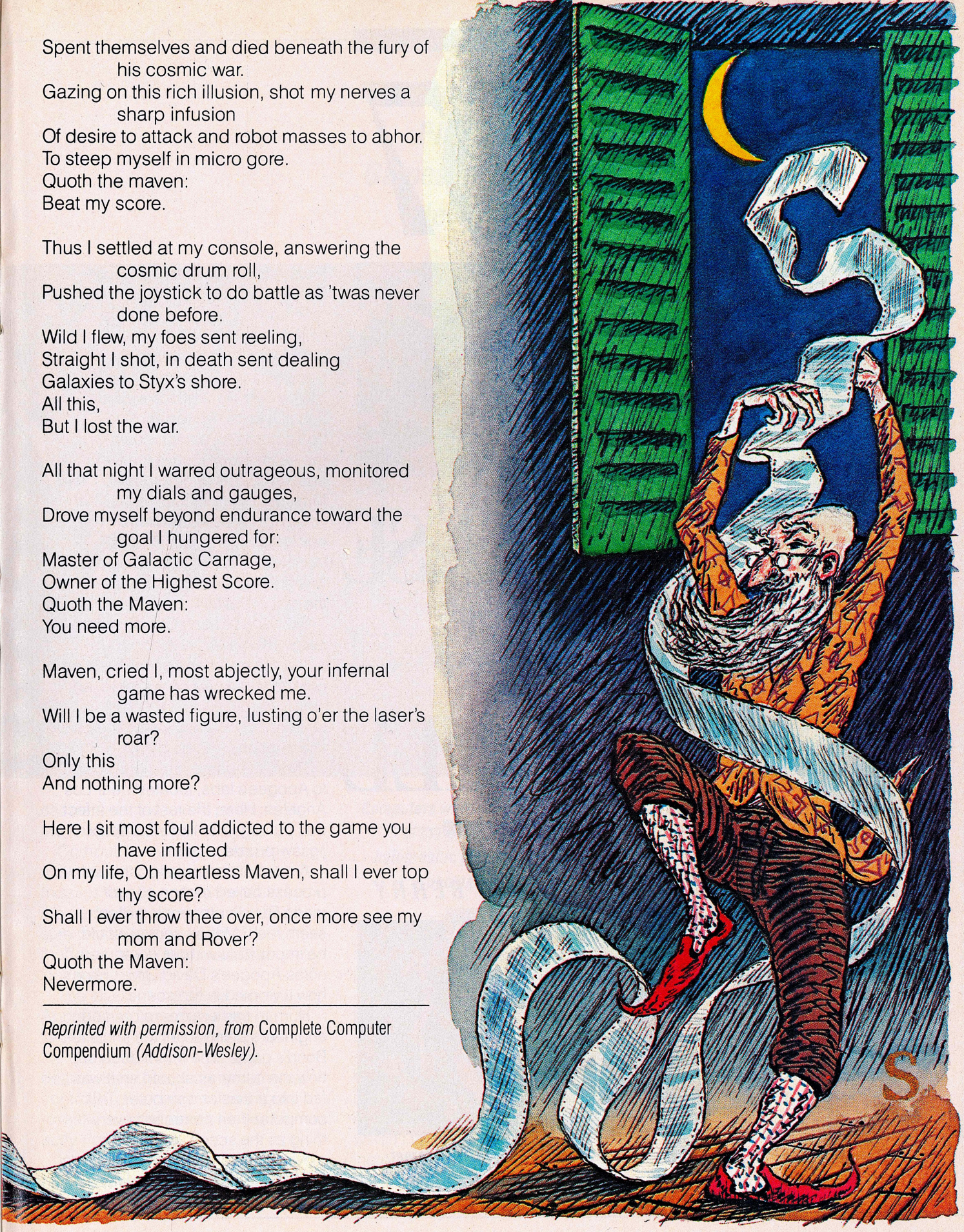

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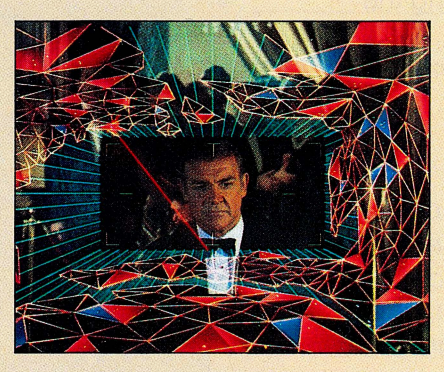


LICENSE TO THRILL

BY PATRICIA BERRY

Two distinguished gentlemen, dressed in tuxedoes, sit across a table from each other. They clutch joysticks. Between them, a ghostly holographic globe floats inside an upright frame. As they press firing buttons, the gentlemen send beams of red light into the globe. They are calmly playing a deadly electronic game where laser beams are the weapons to capture cities, countries, even continents. Suddenly one player unleashes an energy bomb at his opponent. It explodes with very real force. It is just a game, isn't it?

This electronic struggle, it turns out, may actually decide the fate of the earth. And the bad guy—Largo, unflappable member of the crime syndicate SPECTRE—seems to be winning. On whom do the world's hopes rest?

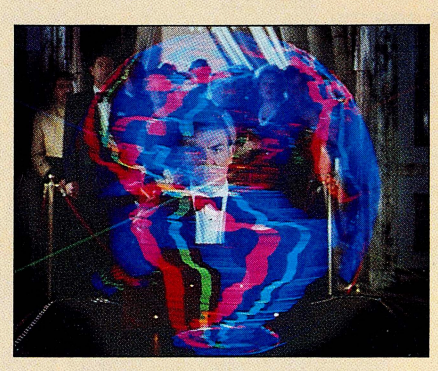
"The name is Bond. James Bond."

As you have no doubt guessed, this incredible game of world domination won't be coming soon to an arcade near you. But you *will* be able to see it. It is the newest gadget in the latest 007 movie, *Never Say Never Again*.

The plot of *Never Say Never* is basic Bond. Largo and SPECTRE want the profits from the world's energy and oil sales. If they don't get their way, they threaten to explode two nuclear cruise missiles they've stolen.

Bond's mission: to stop SPECTRE—and fast.

The high-stakes global game scene lasts only four minutes but it took over four *months* to create.



James Bond is the real target in the film's electronic game.

More than 50 animators, model makers, photographers, cameramen and computer engineers worked on it.

The game was created by Apogee, Inc., a specialty house run by *Star Wars* effect wizard John Dykstra. Apogee's electronic game "is a microcosm of the entire movie," says the film's special effects director, David Dryer. Most of this microcosm of mayhem, which includes laser firings, holographic imagery, missile launches and mid-air explosions, was created a continent away from the rest of the film.

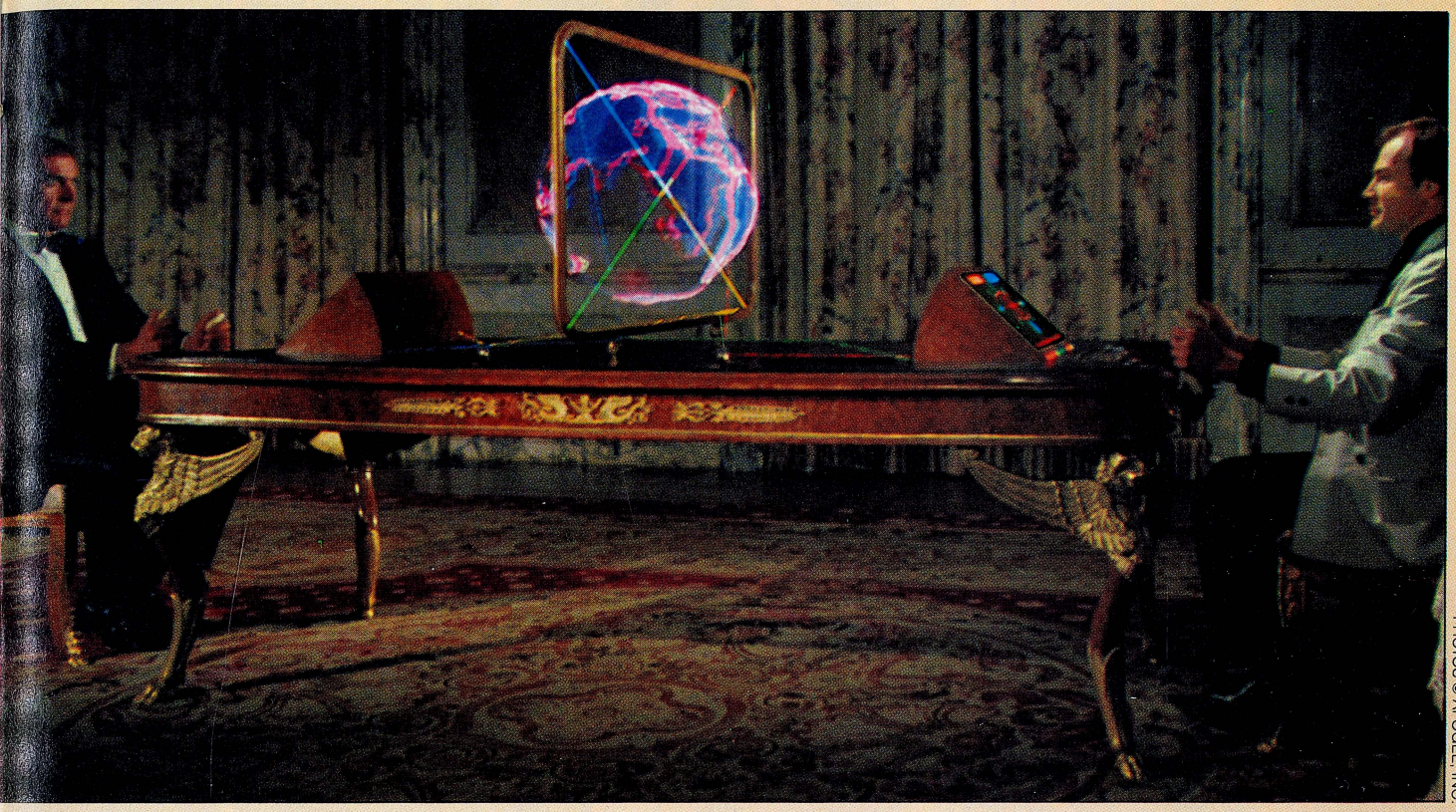
First Bond (Sean Connery) and Largo (Klaus Maria Brandauer) acted out the scene on location in Europe. They had only a table, an empty frame, and some non-functioning controls—plus their imaginations—to go by.

Then, the game table was flown to Apogee's labs, located near Los Angeles. Here, the rest of the effect was put together like a complex jigsaw puzzle.

A special computer-controlled process called *motion control* made Bond's electronic ordeal seem real. "Motion control would be impossible without computers," notes Apogee's David Dryer. Here's how it worked in the scene:

Human camera operators and engineers planned all the shots for Bond's game. The information on how the cameras should shift was fed into a master computer. This computer then controlled everything as the scene was filmed, moving the cameras and shifting the lights precisely. In this way,

Bond and Computers Play Deadly Games in 'Never Say Never Again'



PHOTOS © APOGEE, INC.

each element would fit perfectly in the finished scene.

Computers were also used to move models—for example, the missiles that fly across the table in the game. These computers made sure that the cameras shot the models in a way that made them look menacing.

The lasers in the game are real. Apogee has three large lasers. Technicians set the lasers up on the game table and fired the beams. Here, too, a computer was controlling the cameras and lights to make sure the lasers looked exactly right.

When all the parts of the scene had been filmed, the Apogee engineers used a photographic process called *layering* to put them together. A special computer-controlled system placed each small image—laser blasts, a bomb, a shot of the holographic globe—into each frame of film. Thanks to layering, nothing overlapped and everything looked realistic. If it weren't for this sophisticated layering process, the film might have been overexposed or double-exposed and fuzzy. The precision of the computer is what makes it look like all the effects—created separately—actually happened at one time and place.

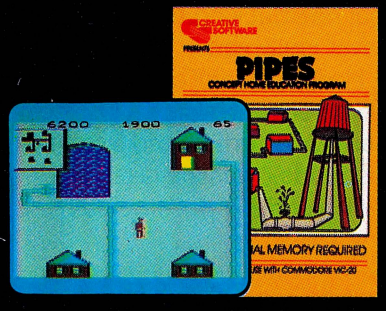
Computers were used to create some of the game's effects. The holographic globe, though, was a photographic trick.

So, if you see the film, remember that you're watching Bond stare at a hologram that really isn't there, and that he's ducking missiles that he never really saw.

How does it all end? Does 007 ultimately win this deadly electronic game? "When," David Dryer responds, "was the last time Bond *didn't* ultimately overcome his enemy?"

PATRICIA BERRY is associate editor of ENTER Magazine.

HELP WANTED:



Arlo is a hard-working plumber, but a touch absent-minded. He's building a water supply system for the whole neighborhood, and he really has his hands full. Help Arlo decide what kind of pipe to buy and where to put it…his limited budget doesn't leave him much margin for error. Figure out the shortest, most economical way to get everyone hooked up…and just hope poor Arlo has remembered to open and close the right valves. A marvelously entertaining and challenging exercise in planning, economics and spatial relationships for all ages.

PIPES. For the VIC-20 and Commodore 64.

C R E A T I V E S O F T W A R E

"VIC-20" AND "COMMODORE 64" ARE TRADEMARKS OF COMMODORE ELECTRONICS, LTD.

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BEST OF THE QUESTS

BY JON JOHANSEN

Great adventure games always provide a challenge. When the walls are closing in and the floor is crumbling, they force you to figure a way out and make the leap to safety.

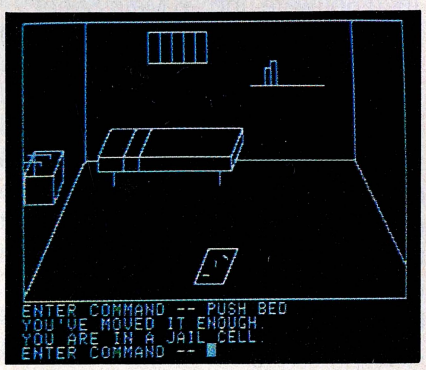
Jon Johansen, a 14-year-old adventure game player from Houghton, Michigan, has met the challenge of countless adventures. He's returned to tell ENTER what he's learned during his exploits.

I've found that the best adventure games are those that make me feel like I am in control. They put me down in a jungle or a castle dungeon —then *dare* me to survive. They are unpredictable, throwing all kinds of crazy obstacles in my path. They keep me laughing, they keep me guessing, and they keep me on my toes.

Whether you are a veteran adventurer or are just getting started, there's an adventure game out there for you. It's smart to begin by playing one of the easier games until you learn basic survival skills, then work your way up to the more complex and confounding adventures.

Below, I've reviewed some of the most popular computer adventure games. I note if they are simple, intermediate or advanced adventures. Whatever your level, enjoy the voyage.

ESCAPE FROM RUNGISTAN



PLOT: You're in a cell, deep in the African nation of Rungistan. Your fate: execution at sunrise. Your only hope is to escape!

GRAPHICS: The graphics are black and white , but filled with detail. And some scenes are animated, letting you do things like run towards a cliff and jump at just the right moment.

COMPLEXITY: The game's animation and simple plot make this a great beginner's adventure.

FRUSTRATION LEVEL: The going gets tricky in the mountain areas, but these peaks of peril can be crossed if you're cunning.

REPLAYABILITY: This is only a single disc game, so it's not that complex. However, its clever characters —like a growling grizzly the computer calls a cuddly bear—keep you entertained. And the animation adds extra fun.

COST: $29.95. Available from Sirius Software, 10364 Rockingham Drive, Sacramento, CA 95827.

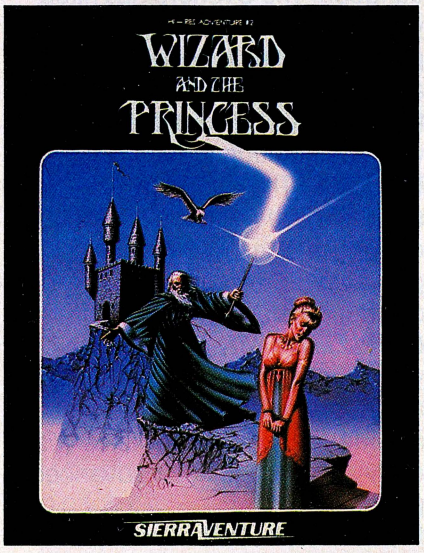
WIZARD AND THE PRINCESS

PLOT: You must travel across oceans, deserts, forests, gorges, and islands to save the Princess from the Evil Wizard.

GRAPHICS: The color graphics are not very detailed, and it takes a few seconds for the computer to draw each picture.

COMPLEXITY: The perplexing puzzles it provides make this a game for intermediate adventurers.

FRUSTRATION LEVEL: Some puzzles have only one obscure solution. That can hold you up and make you very frustrated. It's best to memorize certain solutions, such as the loca-

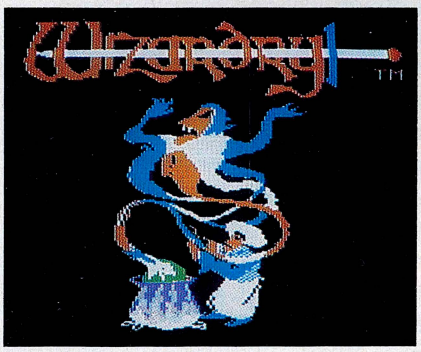


tion of the safe rock used to kill a menacing snake.

REPLAYABILITY: A classic when introduced, *Wizard and the Princess* is beginning to look dated when compared with faster, more detailed and more amusing adventures.

COST: $32.95. Available from Sierra On-Line Systems, 36575 Mudge Ranch Road, Coarsegold, CA 93614.

WIZARDRY: Proving Grounds Of The Mad Overlord



PLOT: Evil wizard Werdna has stolen the Mad Overlord's treasure and hidden it at the bottom of a 10-level dungeon. The Overlord has hired you to recover the treasure. To complete this fantasy role-playing adventure, you must create and train a party of six characters who will travel through the dungeon.

GRAPHICS: The dungeon is represented in three-dimensional line drawings. When monsters and dangers appear, they are shown in colorful detail.

COMPLEXITY: *Wizardry* really tests your mapping ability. And you're a goner if your characters are not incredibly strong. This makes *Wizardry* a challenge fit for advanced players.

FRUSTRATION LEVEL: There are many ways to maneuver through the dungeon maze, and that means you won't get stuck in too many dead ends. But powerful enemies can obliterate you just when the treasure is near.

REPLAYABILITY: There are so many paths and dangers to explore that *Wizardry* will intrigue any adventurer for a long time. This is one of the best role-playing computer adventures. I highly recommend it.

COST: $40.95. Available from Sir-Tech Software, Inc., 6 Main Street, Ogdensburg, NY 13669.

KABUL SPY

PLOT: As a government agent, you must infiltrate Kabul, Afghanistan, to either rescue or silence a kidnapped scientist.

GRAPHICS: The graphics in *Kabul Spy* are among the most detailed and colorful I have ever seen.

COMPLEXITY: There are so many puzzles to solve that only advanced adventurers will succeed. Mapping is not a necessity, but it'll sure help.

FRUSTRATION LEVEL: There is so much to explore and so many routes to travel that frustration is kept to an absolute minimum.

REPLAYABILITY: Something different seems to happen every time you play. With its mix of humor, suspense and vivid graphics, *Kabul Spy* is one of the best adventure games available.

COST: $29.95. Available from Sirius Software, Inc., 10364 Rockingham Drive, Sacramento, CA 95827.

TIME ZONE

PLOT: It is 2,000 years in the future. With a time machine as your only weapon, you must save the planet Earth from the evil ruler Ramadu.

GRAPHICS: There are more than 1,000 scenes and all the graphics are incredibly detailed and colorful.

COMPLEXITY: This is about as tough as you can get in adventure gaming. Only advanced adventurers will make it through the six two-sided discs.

FRUSTRATION LEVEL: You must follow a complex procedure to solve the game, but you can have a good time exploring the different zones in any order.

REPLAYABILITY: *Time Zone* may take you a year to solve, but along the way you'll meet such famous people as Robin Hood, Cleopatra, Ben Franklin and Julius Caesar. If you are looking for the ultimate in com-

puter adventure games, this is it.
COST: $99.95. Available from Sierra On-Line Systems, 36575 Mudge Ranch Road, Coarsegold, CA 93614.

TELENGARD

PLOT: You must create a strong character for yourself in this fantasy role-playing adventure—a character who can descend deep into the dark dungeon and defeat the Underground Monsters.
GRAPHICS: None, but *Telengard* uses text and symbols effectively.
COMPLEXITY: This game is good for the intermediate adventurer. You'll need some mapping skills to survive.
FRUSTRATION LEVEL: *Telengard* can be terribly frustrating, but that's part of the thrill. For example, you can spend a week building a character. Then, suddenly, a 50th-level dragon appears and burns your character to a crisp—before you can even draw your sword.
REPLAYABILITY: This single disk holds a 50-level dungeon. It took me three days just to reach an outer wall of level one. *Telengard* should give your money's worth in challenge.
COST: $29.95. Available from Avalon Hill Microcomputer Games, 4517 Harford Road, Baltimore, MD 21214.

ZORK I

PLOT: The dark reaches of the Underground Empire of Zork await your exploration. You must search the kingdom for treasures. But keep a light on or the grue will get you!
GRAPHICS: It does not have—nor does it need—graphics. The text descriptions vividly describe this adventure world.
COMPLEXITY: It takes concentration, persistence and accurate mapping abilities to play *Zork*. You should have some adventure experience before you take it on.
FRUSTRATION LEVEL: This can be a difficult game, but it's also filled with friendly hints. And if you still need help, use the *Zork* Users Group. They can be reached at Dept. A, P.O. Box 20923, Milwaukee, WI.
REPLAYABILITY: *Zork* is a large, complex and almost endlessly intriguing game that will provide many months of enjoyable play.
COST: $39.95. Available from Infocom, 55 Wheeler St., Cambridge, MA 02138.

RACE FOR MIDNIGHT

PLOT: You awaken as a werewolf in 14th-century England. You must search a nearby dungeon for the ingredients to concoct an antidote. Make sure you've mixed everything before you drink the potion—or else.
GRAPHICS: The color graphics and dungeon sounds make this adventure come alive.
COMPLEXITY: This game is for beginners. There are obstacles, but you should be able to get through without too much trouble.
FRUSTRATION LEVEL: The only frustrating part is the combat

section. In combat, you don't need skill, just pure luck.
REPLAYABILITY: The adventure is not too difficult, but the dungeon's 200 rooms give you lots to explore. Still, there's not much to do once the adventure's solved.
COST: $29.95. Available from Avante-Garde Creations, P.O. Box 30160, Eugene, OR 97403.

ICE PIRATES

(Game begins on page 4)

The ship has docked next to a giant block of ice. The crew has gone ashore. You suspect that this is only the tip of the iceberg and that Glich's secret lair must be near. You follow the crew's footprints in the snow until you reach a cave. At the back of the cave is an elevator. You are suspicious. Not many icebergs have elevators. But you get in and press the button marked "Inner Sanctum." The elevator descends. The door opens. In an instant, you are surrounded by Glich's crack troops, the Ice Kadets. "I was expecting you," says Glich, sitting in his throne, cradling the enchanted ice maker.

You must act swiftly. If you drink from the magic flask, go to page 51. If you draw your sizzling saber, go to page 62.

THE PUZZLING PROGRAMS OF BELA SELENDY

BY ELIZABETH HETTICH

An 11-year-old boy sits hunched over the keyboard of a TRS-80 computer. The glow of the screen lights up his face. He's been absorbed for hours, guiding the cursor across the screen. Finally, a smile crosses his face—it's working. The cursor sketches the outline of a cake and candles. Suddenly, lights start flashing, the candles are flickering. The boy's face breaks into a grin—he did it! He created a program to draw a birthday cake with flashing candles, and got it to run on the computer.

The boy is Bela Selendy at work on one of his earliest programs. Now 15, Bela has grown into a bit of a computer wizard. He programs mysteries, simple arcade-style games, and abstract three-dimensional drawings, all on his school's computer. But Bela's favorite program is the one that enables him to make computer-generated mazes. Using it, he develops intricate networks of passageways and dead-ends that could baffle even the most highly skilled maze fan.

From Doodles to Computer Graphics

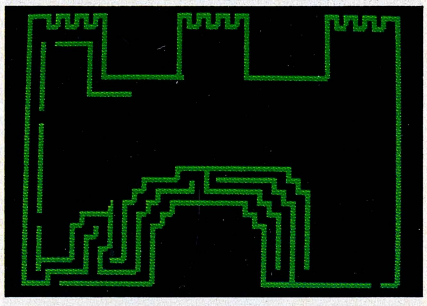
Bela, who lives with his mother and older brother, Phillip, in West Cornwall, Connecticut, has been making mazes for years—the old-fashioned way, by hand. "It began as a hobby that evolved from avid doodling," he says. In fact, Bela's hobby turned into a modest business when a local paper began publishing his mazes on its weekly puzzle page.

During the 1978–79 school year, Bela discovered computers. "They were a big mystery to me, and lots of kids knew about them," he remembers now. "I just wanted to know how they worked." That summer, Bela borrowed his school's TRS-80 and, with the help of an instruction booklet and lots of perseverance, taught himself to program.

"I went through that booklet and played around with the programs until, by the end of the summer, I had a basic knowledge of how to program. I'm still learning, though, more and more."

Early last year, Bela decided to see if he could combine two of his hobbies—computer programming and maze-making. He worked on a "maze-maker" program for a week, starting by writing out the program on paper. Next, he typed it into the computer and tried to run it. "It didn't work. Of course, it never works right away. There are so many simple things that can go wrong—one typographical error can foul the whole thing up."

The most puzzling problem that Bela faced was how to teach the computer to draw lines of varying



Bela begins a computer maze.

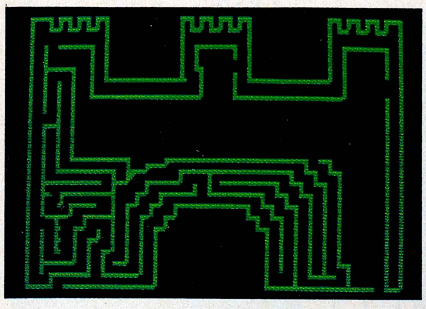
widths. That was important, he says, because otherwise all the mazes would look very similar. "I gave the computer instructions that I thought would work, but they didn't," he remembers. "It took me several tries before I worked it out."

Bela kept working on the program, using his school's new Apple II+, solving one problem after another. Finally, he created a "bug-free" maze program. Once this program was in place, Bela was able to create ever-more-complex mazes. (For a sample of his work, turn to page 44).

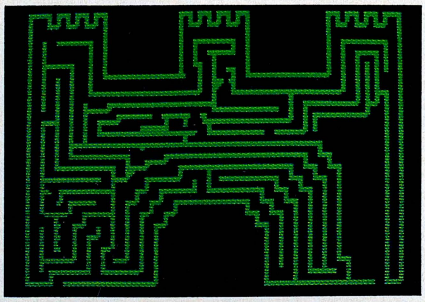
How Mazes Get Created on the Computer

When Bela sits down to create a maze, he has "only a vague idea" of what he wants to do. "Mostly I play it by ear." He begins by drawing an outline—the outer wall that defines the shape of the maze. He leaves two gaps in the outline, one for start and one for finish. When that's done, he decides on the width of the lines he's going to use, and then draws "lots of lines and intricate paths inside the outline.

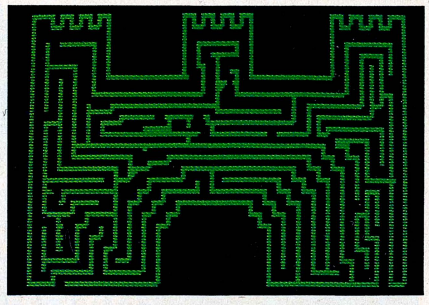
"Generally, I stick to the outside walls and build inward, drawing a single line." He continues until all



Leaving gaps for paths, he draws a grid.



It can take three hours to draw a maze.

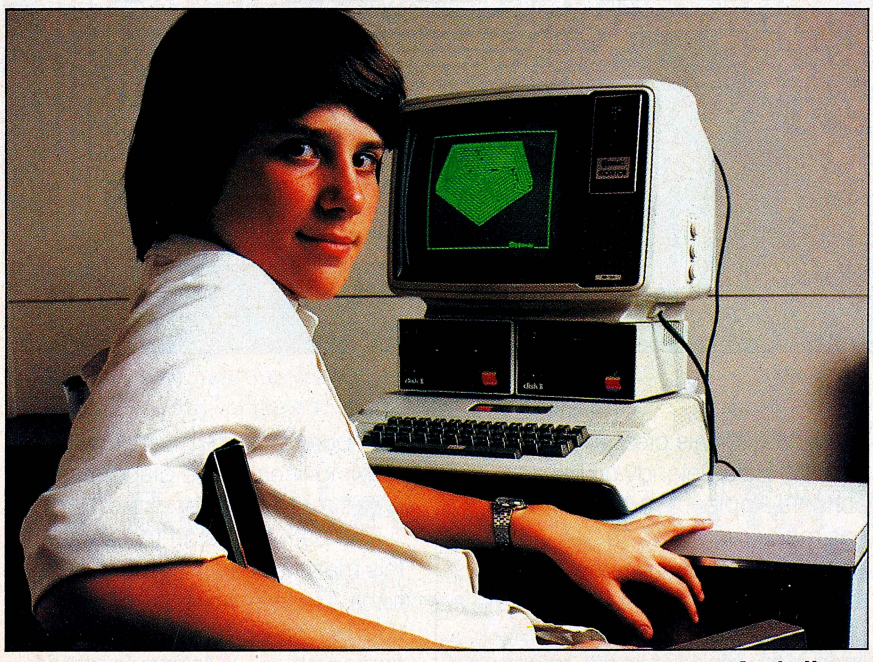


The end product: a jumble of squiggles.

the spaces are filled in. Occasionally, one of his finished mazes is so difficult that it will take a friend as long to get through (up to three hours) as it took Bela to create.

Making a maze on a computer is a challenge, and that clearly is one of the reasons why Bela likes doing it. But, he points out, maze-making also is simply faster on the computer than it would be by hand. When he does a pen-and-paper maze, Bela explains, "Each line has to be measured and drawn with a ruler." The computer does away with all these worries: "On the computer, an incredibly super-complicated maze might take several hours, but drawing it would take 12 hours."

Bela has done all of his mazes—more than 15 to date—on his school computer, because he still doesn't have one at home. He hopes to buy a home computer soon, preferably one with a color printer. "I'd work out a program for color mazes, and would try to incorporate circles and arcs into my program," he says, eagerly. "There would be all sorts of problems to figure out, but it would give me a lot to work with. Then I could do different colored mazes composed of millions of circles and shapes. They would be *really* complicated to get through!"



Bela, 15, sits back after conjuring up another amazing maze on an Apple II+.

PHOTOS © DEBORAH FEINGOLD

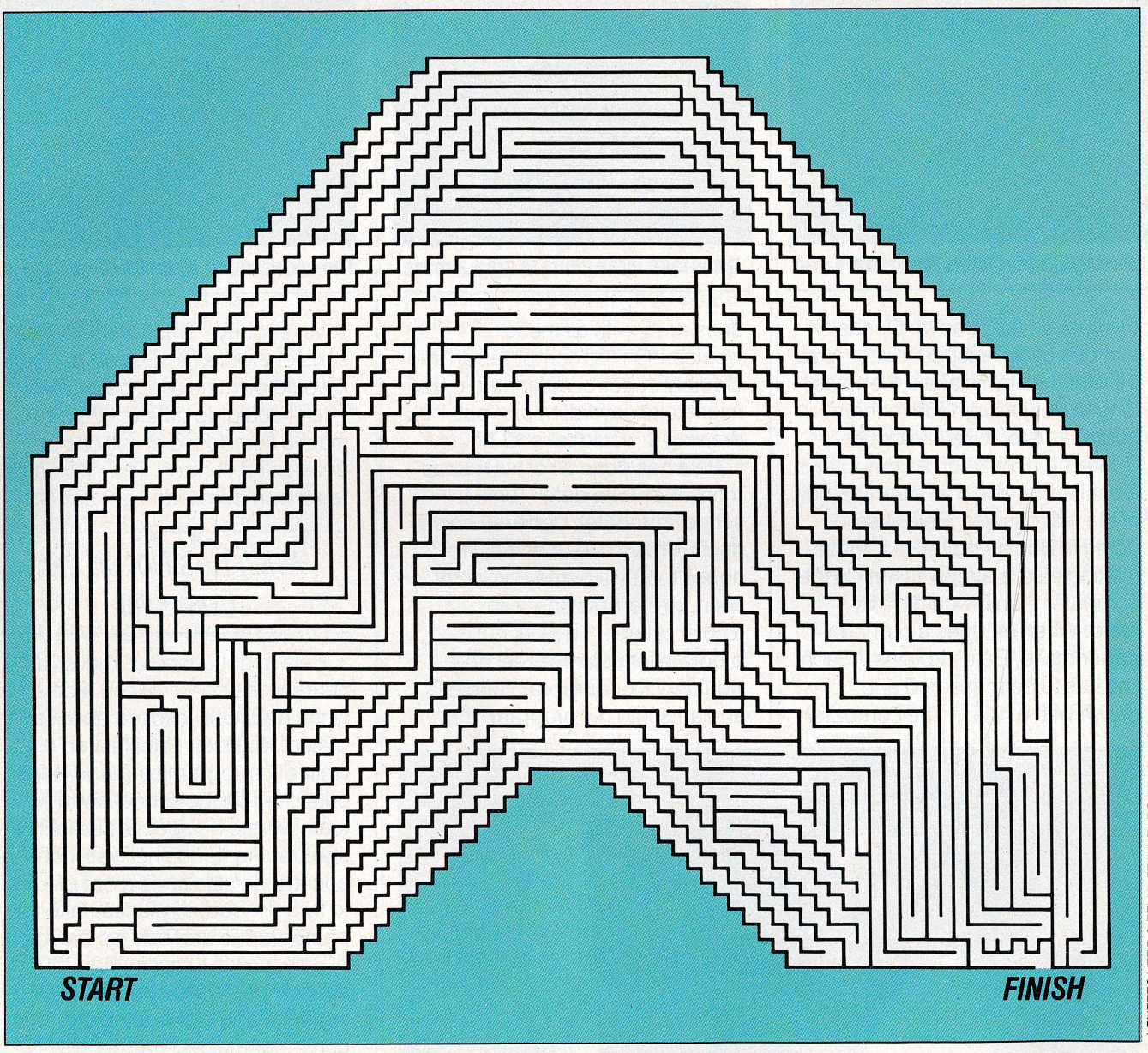
When He's Not on the Computer

Bela might spend as many as 10 hours at the computer on a day when he's really excited about a project. But his interests aren't limited to programming and printouts. He's on the school swim team, where he specializes in freestyle racing. Since he lives in the country, he also finds great places to fly his model airplanes, take photographs and ride his bicycle.

Bela, now a junior in high school, intends to continue making more and more complex computer mazes. Has he ever considered trying to program the computer to *solve* one of his mazes? "Gee," he remarks, "that would be an interesting challenge." But after reflection he adds with a laugh, "It would only take me about 10 years to create."

ELIZABETH HETTICH is the assistant editor of ENTER Magazine.

BELA'S MINDBENDER MAZE



LINE DRAWING © NINA WALLACE FROM COMPUTER GENERATED MAZE © BELA SELENDY

ICE PIRATES

(Game begins on page 4)

You are safe! Glich's pirate crew becomes confused when you disappear. They stop to look for you. Quickly, you scramble aboard ship. Go to page 18.

This maze was created by 15-year-old Bela Selendy on his school's Apple II + computer. Bela has made more than 15 computer-generated mazes over the past three years.

You'll notice that the diagonal lines in the maze are not straight. Computers have a difficult time drawing lines on the diagonal, so Bela's maze has step-lines.

The path from start to finish on this maze is filled with twists and turns. There *is*, however, one solution that will work. Good luck in finding it! *Answers on page 64.*

WORD PROCESSING HAS NEVER BEEN SIMPLER

Coming Soon for the Commodore 64

Brøderbund's Bank Street Writer turns your Apple or Atari computer into a powerful word processor, with many of the advanced features you'd expect to find only in an expensive business system. Powerful, yet purposefully simple, Bank Street Writer has no complex codes to memorize. The screen guides you every step of the way. It's everything you're ever likely to need in a word processor at a price you can afford. Here are just a few of its many features: • Add, move, insert and erase blocks of text, • Universal search and replace, • Automatic centering and indent, • Automatic word wrap, so you don't have to hyphenate or "return" at the end of each line, • Potent print format routines all in memory, • Disk storage and retrieve functions with password protection, • Document chaining allows you to print documents of unlimited length, • Page headers and automatic page numbering—top or bottom, • Highlighting of text, • Upper and lowercase without additional hardware.

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Bank Street Writer. The ground-breaking, sensible combination of word processing power, thoughtful design, and exceptional value.

The First Word Processor For The Entire Family.

Hardware requirements: Apple version requires Apple IIe or 48K Apple II Plus or 48K Apple II with Applesoft in ROM or RAM, and a 16 sector controller. Atari 400/800/1200XL version requires 48K (BASIC cartridge for use of tutorial). Both versions require only one disk drive.

Brøderbund Software

17 Paul Drive, San Rafael, CA 94903, Telephone (415) 479-1170

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Fractured Flowcharts

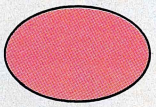
AN ENTER QUIZ

BY MEGAN STINE & H. WILLIAM STINE

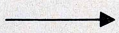
What is all this stuff that looks suspiciously like a geometry lesson? Any seasoned computer fanatic (sometimes known as a *terminal* case) knows the answer—*flowcharts.*

Before you can write a program in a computer language, you have to think through every step you want the computer to perform. A flowchart is a step-by-step diagram. It helps you to organize your thoughts by letting you see each step the computer is about to take. By using a flowchart, you can catch a lot of mistakes before they happen and save yourself time and headaches later on.

We've prepared a little quiz to see if you can go with the flow. To read the charts here, you need to know these symbols:



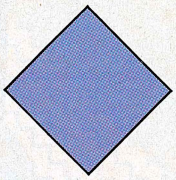
Start or stop



Indicates directions of flowline.

Connector symbol—joins one part of flowchart with another. "Y" means a Yes answer—go in the direction indicated by the arrow. "N" means your answer is No—but you still have to follow the arrows.

A single step which leads to the next one.

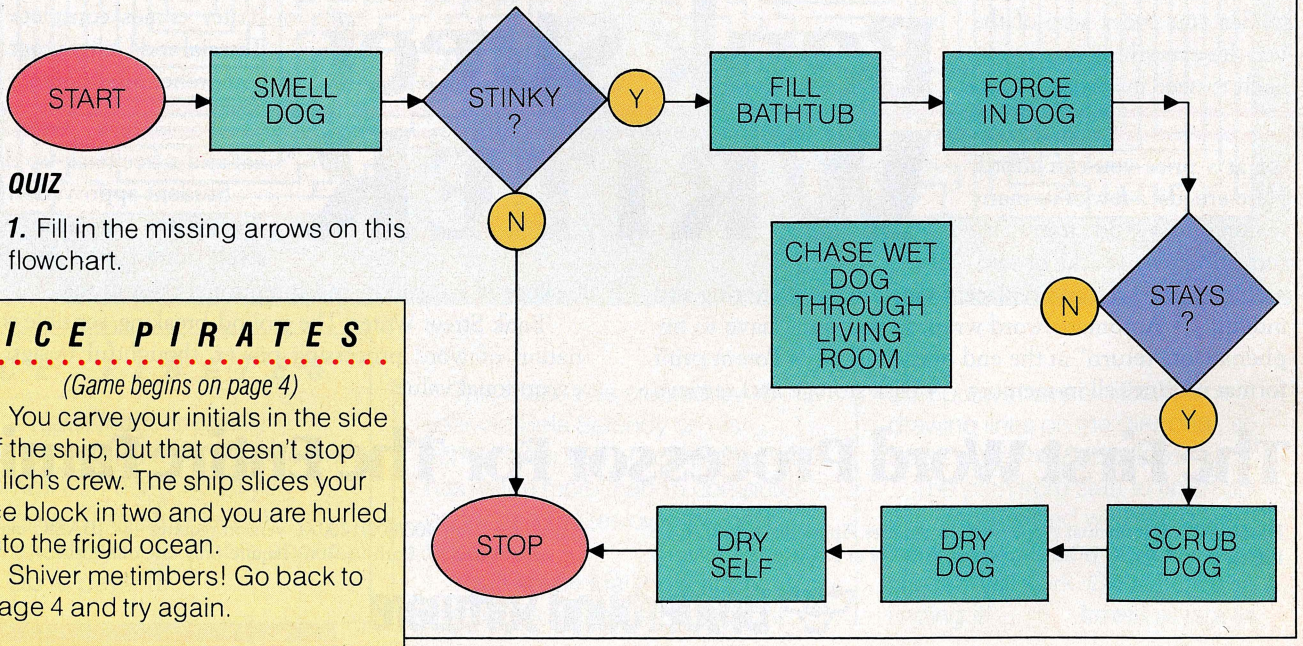


A complex step. The computer must make a decision. Every decision has two possible answers—usually "Yes" or "No."

Now test yourself on these fractured flowcharts. We've thrown in a couple of errors, and we've left you with a couple of unresolved situations. It's not that you could ever program a computer to spend money—or that you would ever want to. But if you did, you'd probably start with a flowchart.

Answers on page 64.

HOW TO WASH YOUR DOG



QUIZ

1. Fill in the missing arrows on this flowchart.

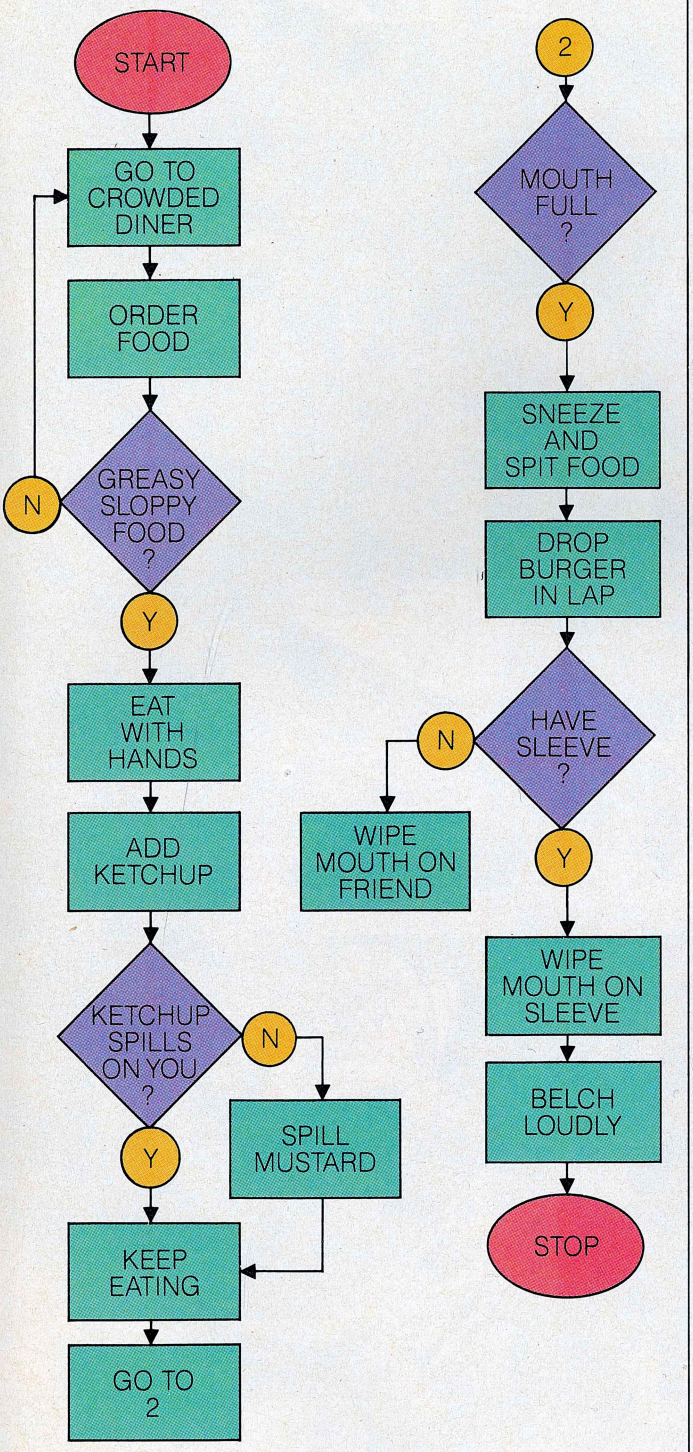
ICE PIRATES

(Game begins on page 4)

You carve your initials in the side of the ship, but that doesn't stop Glich's crew. The ship slices your ice block in two and you are hurled into the frigid ocean.

Shiver me timbers! Go back to page 4 and try again.

HOW TO EAT LIKE A PIG



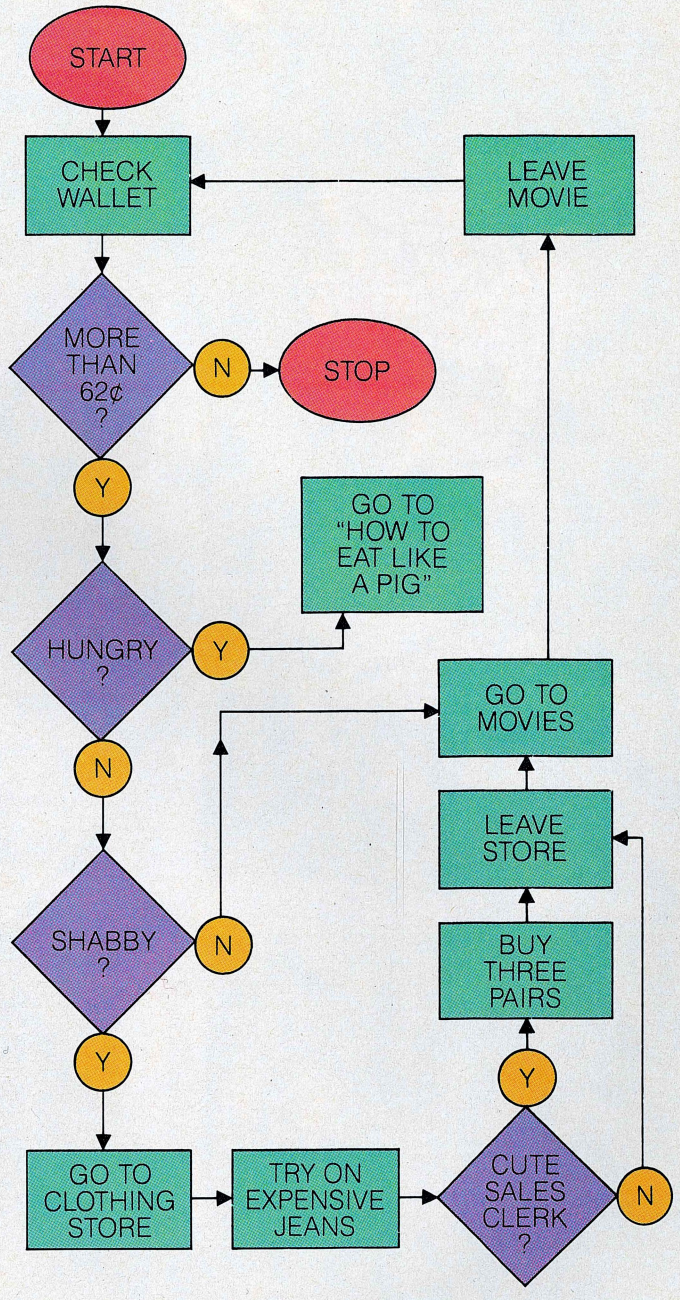
QUIZ

2. Read this flowchart. What happens if you don't spill ketchup on you?

3. What happens if you never order greasy sloppy food?

4. This flowchart has two mistakes—two things missing. Try and find them.

HOW TO SPEND MONEY



QUIZ

5. Read this flowchart. What happens if you're not shabby?

6. Will this flowchart ever end, or does it go in circles forever?

ICE PIRATES

(Game begins on page 4)

It's a barrel of monkeys. But you aren't having any fun. These hundreds of tiny monkeys are part of Glich's evil arcade scheme. These are the infamous microchimps!

You leap from the barrel and are taken prisoner. GAME OVER.

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basic training

TIC-TAC-TOE

BY JEFF NILSON

Most games get more enjoyable as you get better at them. But if you saw *WarGames* last summer, you learned about two games where that's not true. In playing a war game, the better you get, the more you lose. In this way, war games are like the ancient game of Tic-Tac-Toe. In Tic-Tac-Toe, if you and your opponent know all the tricks of the game, neither of you can win.

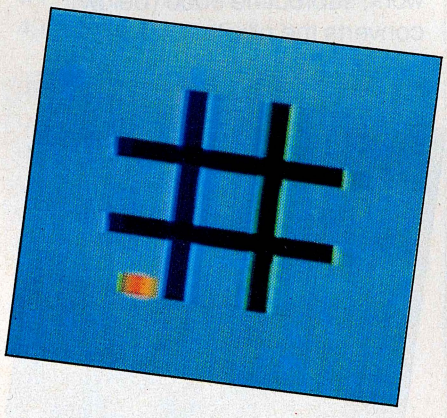
This month's "Basic Training" program is for the Texas Instruments 99/4 and 99/4A computers. To enter the program and play the game, simply type in the instructions in the order you see them here. If you want to know *what* you're telling the computer to do, and *how* it does it, read the explanations between the programming material.

As you type, be careful. A few of the numbers and letters may look confusing. Watch for these: The number 0 is **0**; The letter O is **O**; The letter I is **I**; The number 1 is **1**; The letter D is **D**.

The Program Begins Here

Begin by typing in the following lines, which draw the game grid and the directions.

```
 1 RANDOMIZE
 5 REM **DRAW GAME
   GRID**
 7 CALL CLEAR
10 CALL SCREEN (15)
15 CALL COLOR (3,2,2)
20 FOR I=0 TO 1 STEP 1
30 CALL HCHAR (12+(I*4), 11,
   48, 11)
40 CALL VCHAR (9, 14+(I*4),
   48, 11)
50 NEXT I
55 FOR I=1 TO 3
```



```
57 FOR J=1 TO 3
60 TD (I, J)=0
63 NEXT J
65 NEXT I
68 REM **INSTRUCTIONS**
70 PRINT TAB (8); "PRESS
   SPACE BAR"
80 PRINT TAB (8); "TO MOVE
   SQUARE."
85 PRINT
90 PRINT TAB (8); "PRESS
   ENTER TO"
100 PRINT TAB (8); "CHOOSE
   SPACE."
```

The "MAIN LINE" of the program begins (below) at line 190 and goes to line 910. Lines 210 through 820 "call" the sub-routines (2000,3000,etc.) that actually play the game.

```
190 FR = INT(2*RND) + 1
192 V V = 0
194 IF FR = 2 THEN 500
```

The first subroutine begins at line 2000. Working with the information in the subroutines at lines 7000, 8000, and 9000, subroutine 2000 enables the person playing the computer to select the space for the "X."

Type lines 200 through 220 and subroutine 2000.

```
200 REM **PLAYER MOVES 'X' **
210 FL=0
213 IF V V=9 THEN 11000
215 GOSUB 2000
220 V V=V V+1
```

```
2000 REM  **MOVE 'X'**
2005 K=0
2007 XD=0
2010 CALL COLOR (12,10,10)
2015 REM  **PUT SELECTOR
     ON GRID**
2020 RN=14
2022 RO=14
2024 CN=12
2028 CO=12
2030 CALL HCHAR (RO, CO,
     126, 1)
2040 CALL KEY (0,K,S)
2050 IF (S=0)+(S= -1) THEN
     2030
2060 IF K=32 THEN 7000
2070 GOSUB 9000
2100 IF (K=13)*(TD(R,C)=0)
     THEN 8000
2110 IF XD=1 THEN 2140
2120 K=0
2130 GOTO 2040
2140 RETURN
```

This subroutine (above) tells the computer when the player has pressed the space bar. If the space bar has been pressed, subroutine 7000 moves a light red square from space to space in the

(Continued on page 50)

PHOTOS © DEBORAH FEINGOLD

(Continued from page 49)

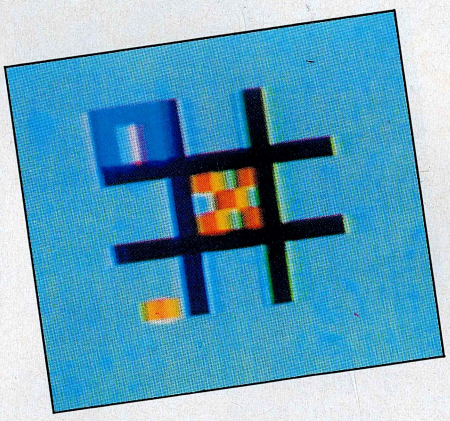
Tic-Tac-Toe grid. Now type it in.

```
7000 REM **MOVE SQUARE**
7005 RN=RO-4
7010 IF (RN< 6)*(CN<20) THEN
     7015 ELSE 7020
7015 CN=CO+4
7016 RN=RO+8
7020 IF (RN<6)*(CN=20) THEN
     7025 ELSE 7030
7025 CN=CO+4
7026 RN=RO+8
7030 IF CN>20 THEN 7035
     ELSE 7050
7035 CN=12
7040 RN=14
7050 CALL COLOR (13,1,1)
7060 CALL HCHAR (RO, CO,
     128,1)
7070 CALL COLOR (12,10,10)
7080 CALL HCHAR (RN, CN,
     126,1)
7100 RO=RN
7110 CO=CN
7120 GOTO 2070
```

If the player presses the ENTER key, subroutine 8000 (below) will draw an 'X' in the space where the moving square is located. Type it in.

```
8000 REM **DRAW 'X'**
8010 RM=RN-2
8020 CM=CN-1
8025 CALL COLOR (14,7,7)
8030 FOR I=0 TO 2
8040 CALL HCHAR (RM+I,
     CM+I,136,1)
8050 CALL HCHAR (RM+I,
     (CM+2)-I,136,1)
8052 NEXT I
8055 XD=1
8060 TD(R,C)=1
8070 XR=R
8075 XC=C
8080 CALL COLOR (13,1,1)
8085 CALL HCHAR (RO,CO,128,1)
8090 GOTO 2110
```

Before subroutine 8000 can work, subroutine 9000 (below) converts the position of the 'X' to



pairs made up of the numbers 1, 2, or 3. These pairs of numbers are used to indicate the location of each square in the game. (1,1) is the upper left square, (2,2) is the middle square and (3,3) is the lower right-hand square.

```
9000 REM **CONVERT RN,
     CN FOR ARRAY**
9010 DR=RN-2
9020 R=DR/4
9030 DC=CN-8
9040 C=DC/4
9050 RETURN
```

Once the computer knows where to put your "X," the next part of the game program checks the consequences of your move. Lines 300 through 320 call subroutine 3000, the "checking" subroutine. Type them into your T.I.

```
300 REM **DID PLAYER WIN?**
310 WN=1
312 TR=XR
314 TC=XC
320 GOSUB 3000
```

Subroutine 3000 (below) checks on two things. Did the player's last move win the game? In other words, is there a row, column, or diagonal in the same grid with three X's in it? Or is the player about to win with two X's and an empty space? Enter this subroutine.

```
3000 REM **DID SOMEONE
     WIN?**
3002 FH=0
3004 FV=0
3006 RB=0
3008 CB=0
3009 YR=0
3010 YC=0
3011 ZR=0
3012 ZC=0
3015 FOR I=0 TO 2
3020 IF TD(TR,1+I)=WN THEN
     3025 ELSE 3030
3025 FH=FH+1
3030 IF TD(1+I,TC)=WN THEN
     3035 ELSE 3040
3035 FV=FV+1
3040 IF TD(TR, 1+I)=0 THEN
     3042 ELSE 3045
3042 ZR=TR
3043 ZC=1+I
3045 IF TD (1+I, TC)=0 THEN
     3047 ELSE 3050
3047 YR=1+I
3048 YC=TC
3050 NEXT I
3055 IF (FH=3)+(FV=3) THEN
     10000
3060 IF ABS (TR-TC)=1 THEN
     3170
3100 IF TR-TC=0 THEN 3600
3120 IF TR+TC=4 THEN 3800
3170 RETURN
```

Lines 3600 through 3800 are used by subroutine 3000 to decide the consequences of your move.

ICE PIRATES

(Game begins on page 4)

You have stayed in better hotels, but this box will make a fine hiding place. You have to listen to the captain sing cold-hearted versions of "Bette Davis Ice" and "I Only Have Ice For You"—but there are far worse fates.

When all is quiet, you get out of the box and go to page 41.

Enter them now.

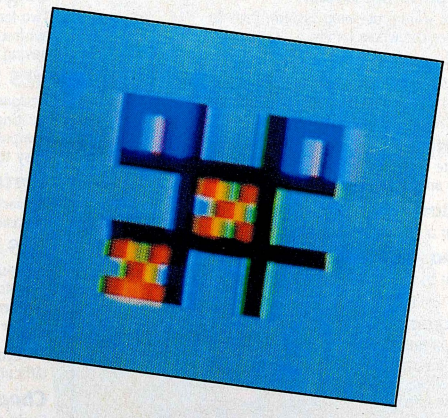
```
3600 REM **CHECK LEFT/RIGHT
     DIAGONAL**
3610 FD=0
3612 LR=0
3614 LC=0
3620 FOR I=1 TO 3
3630 IF TD(I,I)=WN THEN 3635
     ELSE 3640
3635 FD=FD+1
3640 IF TD(I,I)=0 THEN 3645
     ELSE 3660
3645 LR=I
3650 LC=I
3660 NEXT I
3665 IF FD=3 THEN 10000
3670 GOTO 3120
```

```
3800 REM **CHECK RIGHT/LEFT
     DIAGONAL**
3810 FR=0
3812 KR=0
3814 KC=0
3820 FOR I=1 TO 3
3830 IF TD(I,4-I)=WN THEN
     3835 ELSE 3840
3835 FR=FR+1
3840 IF TD(I,4-I)=0 THEN
     3845 ELSE 3860
3845 KR=I
3846 KC=4-I
3860 NEXT I
3865 IF FR=3 THEN 10000
3870 GOTO 3170
```

If the player hasn't won, it is now the computer's turn. First, between lines 400 and 440 (below), the computer tries to win. Type them in.

```
400 REM **COMPUTER TRIES
    TO WIN**
410 LIMIT=2
415 WN=-1
420 TR=IR
425 TC=IC
430 GOSUB 3000
435 GOSUB 4000
440 IF FL=1 THEN 800
```

If it can't win, then the computer will try to stop the player from



winning between lines 450 and 490. Type these lines in:

```
450 TR=XR
455 TC=XC
460 WN=1
470 GOSUB 3000
480 GOSUB 4000
490 IF FL=1 THEN 800
```

Line 470 tells the computer to check the rows, columns, and diagonals with subroutine 3000 again. Then it makes its move with subroutine 4000 (below).

```
4000 REM **COMPUTER'S
     MOVE**
4010 IF (FH=LIMIT)*(ZR>0)
     THEN 4015 ELSE 4020
4015 RR=ZR
4016 CC=ZC
4017 GOSUB 9200
4018 GOSUB 8200
4019 RETURN
4020 IF (FV=LIMIT)*(YR>0)
     THEN 4025 ELSE 4030
4025 RR=YR
4026 CC=YC
4027 GOSUB 9200
4028 GOSUB 8200
4029 RETURN
4030 IF (FD=LIMIT)*(LR>0)
     THEN 4035 ELSE 4040
4035 RR=LR
4036 CC=LC
4037 GOSUB 9200
4038 GOSUB 8200
4039 RETURN
```

```
4040 IF (FR=LIMIT)*(KR>0)
     THEN 4045 ELSE 4050
4045 RR=KR
4046 CC=KC
4047 GOSUB 9200
4048 GOSUB 8200
4050 RETURN
```

Subroutine 4000 uses subroutines 8200 and 9200 to get the ability to draw the 0's for the computer's move. Enter them:

```
8200 REM **DRAW '0'**
8210 RM=RN-2
8215 CM=CN-1
8220 CALL COLOR (15,5,5)
8230 FOR I=0 TO 2
8240 CALL HCHAR
     (RM+I,CM,144,3)
8250 NEXT I
8260 CALL COLOR (13,15,15)
8265 CALL VCHAR
     (RN-1,CN,128,2)
8270 TD(RR,CC)= -1
8285 IR=RR
8290 IC=CC
8295 FL=1
8299 RETURN
```

```
9200 REM **CONVERT R,C TO
RN, CN**
9220 RN=2+ (RR*4)
9230 CN=8+ (CC*4)
9240 RETURN
```

Now the stage is set for the computer to make its move. Lines 5000 through 5240 decide for the computer what move it will make.

(Continued on page 53)

ICE PIRATES

(Game begins on page 4)

Out of sight! But, unfortunately, not out of trouble. The Ice Kadets have you cornered. In the cold, they can hear your teeth chattering. Now you'll really get the eternal cold shoulder from Glich. GAME OVER.

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(Continued from page 53)

Type in these lines:

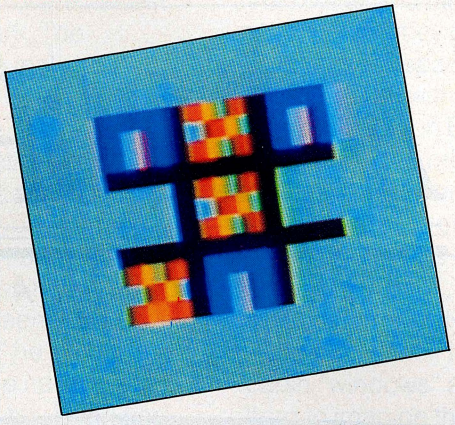
```
500 **REM COMPUTER MAKES
    FIRST MOVE **
510 IF VV < 3 THEN 5000
```

VV(line 510) counts the number of turns that have been taken. At the beginning of the game, the computer goes to lines 5000 through 5030. If the middle is open, the computer will put a zero there. Otherwise, the computer puts a zero in any empty space. Type in subroutine 5000 (below).

```
5000 REM **COMPUTER'S
     FIRST MOVE**
5010 IF TD(2,2)=0 THEN 5015
     ELSE 5020
5015 RR=2
5016 CC=2
5017 GOSUB 9200
5018 GOSUB 8200
5019 GOTO 900
5020 GOSUB 5200
5030 GOTO 900
```

The rest of the MAIN LINE of the program, lines 600 through 820, enable the computer to make other moves. Lines 600 through 640 put a zero in a row, column, or diagonal containing an 0 and two empty spaces. Type them in.

```
600 REM **COMPUTER PUTS
    '0' IN SAME ROW OR
    COLUMN**
605 TR=IR
607 TC=IC
610 LIMIT=1
620 GOSUB 3000
630 GOSUB 4000
640 IF FL=1 THEN 900
700 REM **COMPUTER'S
    RANDOM MOVE**
705 IF VV=9 THEN 11000
710 GOSUB 5200
800 REM **DID COMPUTER
    WIN?**
805 TR=IR
807 TC=IC
810 WN=-1
815 LIMIT=2
820 GOSUB 3000
```



If there are no patterns like this on the board, then 710 (above) calls subroutine 5200 (below), which places a zero in any remaining empty space. Type it in.

```
5200 REM **CHOOSE
     COMPUTER'S MOVE
     RANDOMLY**
5210 R1=INT(3*RND)+1
5220 C1=INT(3*RND)+1
5230 IF TD(R1,C1)=0 THEN 5235
     ELSE 5210
5235 RR=R1
5236 CC=C1
5237 GOSUB 9200
5238 GOSUB 8200
5240 RETURN
```

At the end of the main part of the program, line 900 counts the number of turns taken by adding one to VV, which originally figured out the number of turns (back at line 510). Then, line 910 tells the computer to go back to line 210 for the player's next turn. Type them in.

```
900  VV=VV+1
910  GOTO 210
```

The rest of the program tells the computer what to do if either the computer, or the player, wins. Type them, then type 'RUN' and play.

```
10000 REM **THE WINNER
      IS!**
10002 FOR DE=1 TO 500
10003 NEXT DE
10005 CALL CLEAR
10010 IF WN=1 THEN 10015
      ELSE 10020
10015 PRINT "YOU WIN."
10016 GOTO 11030
10020 PRINT "THE COMPUTER
      WINS."
10025 GOTO 11030
11000 REM **CAT GAME**
11010 CALL CLEAR
11020 PRINT "NOBODY WON
      THIS GAME."
11030 PRINT "WOULD YOU LIKE
      TO PLAY"
11035 INPUT "AGAIN?
      (Y/N)":YN$
11040 IF YN$="Y" THEN 1
11045 CALL SCREEN(15)
11050 END
```

PROGRAM NOTES: If you'd like an adaptation of this month's program for Apple or Commodore computers, send a self-addressed, stamped envelope to ENTER BASIC, CTW, 1 Lincoln Plaza, New York, NY 10023. Tell us which adaptation you need.

ISSUE ONE CORRECTION: Last month's "Basic Training" contained an error. If you change line 60 (page 57) to line 10, the program will work.

ICE PIRATES

(Game begins on page 4)

White vine is always a good choice. You knock the enchanted ice maker away from Glich. The world is saved. You become a hero and the ice maker turns you into a hit at parties. Glich reforms and goes into the frozen food business. GAME OVER.

A CHIP MITCHELL COMPUTER CAPER

THROWN FOR A LOOP

BY FRED D'IGNAZIO

ILLUSTRATION BY ANDREA BARUFFI

"Fasten your seatbelts, boys. And make sure your shoulder harnesses are good and tight."

The uniformed space shuttle officer saluted Chip Mitchell and his friend Legs Feinberg, then closed their cabin door and sealed it shut. The boys were on board the space shuttle simulator—one of the newest rides at "Fantasy World" Amusement Park. The simulator looked like the front part of the real shuttle, with the back chopped off.

When Chip and Legs first entered the cabin, the officer had explained that simulators were used to train new space shuttle pilots. The simulators recreated conditions that the pilots would experience in space.

"Hey!" Legs shouted, after the officer had gone. "When's this baby going to move? I'm getting—*Ooops*!" Suddenly, Legs felt as if he'd been tilted 90 degrees backwards. "What's going on?" he gurgled.

"I think we're in 'launch' position," Chip called out. "Hang on. I have a feeling that this is the easy part. It probably gets worse from here."

The video screens on the cabin windows came to life, showing blue sky above. The simulator began rumbling. All of a sudden, the boys were shoved back into their seats. It felt as if an invisible hand were pushing down on their chests. They could hardly breathe. "We're...taking...off," Chip gasped.

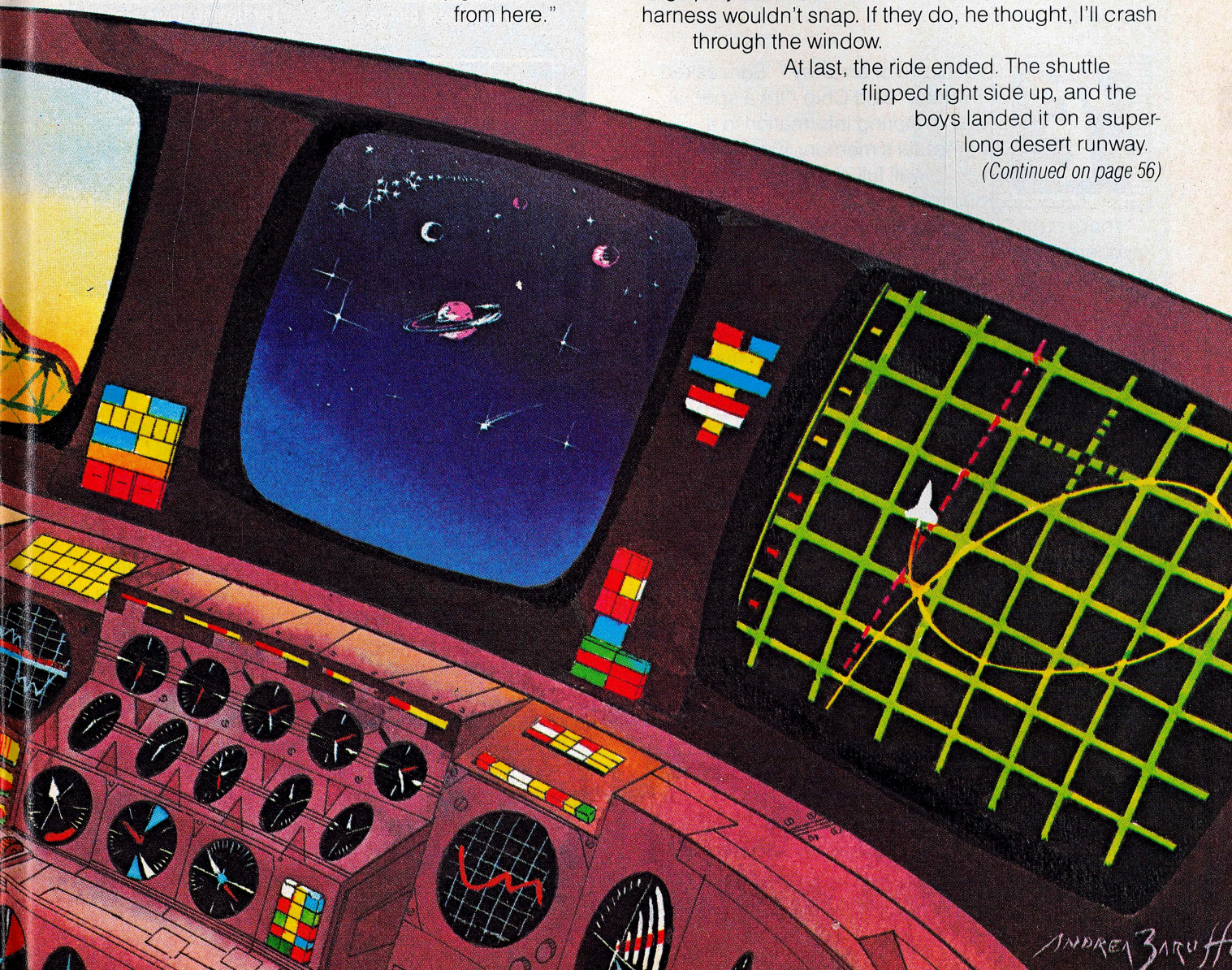
The pictures on the screen changed slowly at first, then faster and faster. First, the boys saw clouds and sky. Then all they could see was the dark, black, emptiness of space. The cabin lights dimmed, and the screens filled with stars. The stars didn't twinkle, as they did back on Earth. Instead, they shone like tiny flashlights, in a rainbow of colors.

The view was beautiful, but the next five minutes felt like five hours to spaceman Legs Feinberg. The space shuttle did things Legs didn't believe were possible. It stood on its back, on its head, and it rolled over. It even flipped completely upside down!

Up above their heads, the boys could look out the cabin "windows" and see the Earth drift by. It wasn't hard to imagine that they really were in outer space. Legs prayed over and over that his seatbelt and harness wouldn't snap. If they do, he thought, I'll crash through the window.

At last, the ride ended. The shuttle flipped right side up, and the boys landed it on a super-long desert runway.

(Continued on page 56)



THROWN FOR A LOOP

The pictures on the shuttle screen changed slowly at first, then faster and faster. The boys saw clouds...then the dark emptiness of space.

It took a while before Chip could convince Legs that it was safe to leave his seat. But he finally did, and the boys climbed out of the shuttle simulator and were led to a "debriefing" room. There Sam Johnson, a "Fantasy World" computer technician, told Chip and Legs how the simulator used computers.

All the buttons, switches, and levers in the debriefing room were wired through the computer to the simulator's video-screen "windows," Sam explained. The images in the windows rotated and made the boys feel like they were spinning around in outer space.

"You mean, the simulator *never* left the ground?" Legs asked, amazed.

"That's right," Sam responded.

"I really liked the way you made the video images roll over and flip upside down," Chip said to Sam. "How'd you do it?"

"Ever heard of an *array*?" Sam asked.

"Sure," said Chip. "It's a special way of storing information in a computer's memory. Kind of like a whole wall full of mailboxes at the post office."

"That's right," Sam said. He turned toward the keyboard at the front of the room and pressed some buttons. On the nine-foot video screen above his head, a huge grid appeared. It looked like snow-white graph paper with green lines running up and down and from left to right. Red, blue, and orange-colored numbers popped into the boxes between the lines.

"The numbers you see on the screen are elements in the array for the shuttle simulator," Sam said. "The numbers represent the colors of each of the tiny little *pixels* on the simulator's video screen."

"Little pixies?" Legs asked.

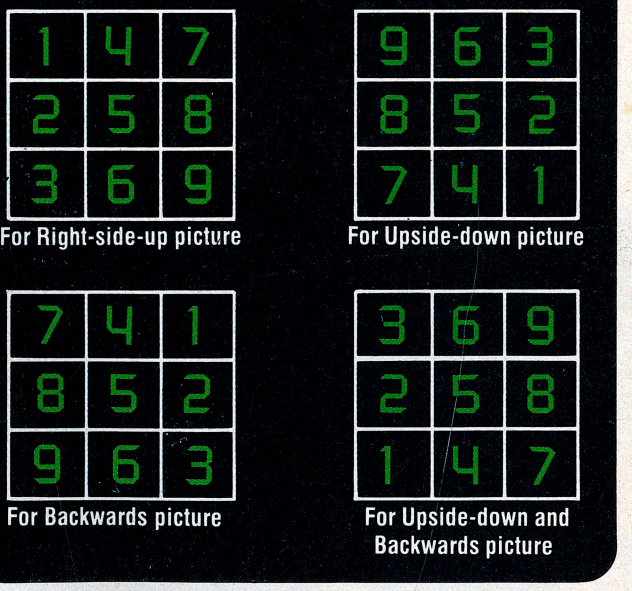
"*Pixels,*" Sam said, smiling. "Picture elements. They're the little points of light on the video screen. The computer's picture is made up of millions of these little points. They're all different colors."

Chip studied the rows of numbers on the screen. "I bet I know how you turn the picture around," he said.

"How?" Sam asked.

"You just change the way you want the computer to read the numbers in the array. For example, you could start at the top left hand corner and just read down the rows. Or you could read across the columns. Or you could read the array upside down and backwards," Chip said. "The picture would flip around, depending on which colors the computer put in each pixel on the screen. And that would depend on the order of numbers the computer took from the array. Like this." Chip ran to the front of the room and drew a picture on the chalkboard.

The computer reads numbers and "prints" pixels in this order:



"That's it, exactly," Sam exclaimed. He pushed some more buttons. Earth appeared on the large screen, drawn in slow motion. It was if a photograph of the planet had been cut into lots of strips. Then the photo was reassembled by taping the strips together, one at a time.

"We use a loop—a repeating program—to 'spray' all the colored points onto the simulator video screens, one strip at a time," Sam said. "We can set the loop to rotate the array. When the array rotates, the picture on the shuttle windows also rotates. It looks like you are whirling around in outer space."

"It's a neat trick," Legs said. "Was it hard to program?"

"To tell you the truth," said Sam, "it was a mess. We had all the points right, so we could draw the picture right-side-up. But as soon as we tried to tilt the picture or turn it upside-down, we ran into problems. We ended up with pictures turning backwards, and pictures being split into several pieces.

"The key to everything was the order in which the

(Continued on page 58)

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THROWN FOR A LOOP

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4HEAZ

The command post reverberated with a shattering screech. Looking back, Chip could see that the volcano map had sprouted red dots.

(Continued from page 56)

computer read the numbers," Sam went on. "When the loop didn't work, it put the wrong colors in the wrong places on the screen. The pictures got all mixed up."

"How did you fix it?" Chip asked.

"Actually we used two loops to draw the simulator pictures," Sam explained. "One was inside the other. The inside loop painted pixels up and down the screen. The outside loop painted them sideways. But we found out that the loops were backwards. The inside loop should have been on the outside, and the outside loop should have been inside. We had them reversed. As soon as we changed, the pictures shifted perfectly."

"That's really interesting," said Chip.

"It's awesome," Legs added.

"Well," Sam said, laughing, "since you boys are so interested in computers, I think I can offer you a treat..."

Twenty minutes later, Chip and Legs found themselves in the "Fantasy World" computer control center. Sam Johnson's special request had gotten them an invitation to see this huge room buried deep beneath the park, where few visitors were allowed. Chip was amazed at the number and variety of computers. All around them, people sat in front of blinking electronic maps and computer terminals. To Chip, it looked like NASA's Mission Control in Houston.

Sharon Walters, "Fantasy World's" Director of Computer Operations, explained what was going on to Chip and Legs. "Computers control and monitor all the park's activities," Sharon said. "Here, for instance,"—she pointed to a bank of computer screens near the center of the room—"are the controls for our famous 'Raging Volcano' ride. Have you boys been on it?"

"Oh, yeah," said Legs. "Riding in a boulder through the earth's crust was great, but all that twirling around made me dizzy."

"It's one of our most complicated rides," Sharon said. "The computer controls the 'boulder' car's speed, the steam from the underground volcanoes, the lava flows and all the other effects that make the ride so exciting. And you're not the only person who got dizzy, Legs. In fact, just a few minutes ago, we made some changes on the ride controls to slow it down during the curves."

Sharon pointed to a map covered with glowing green lights. "This is a map of the volcano ride's course." Next to the map were several screens showing sections of the boulder car's track. "We have video cameras every few yards along the car's route," Sharon told the boys. "They monitor the car's journey through the volcano. If anything goes wrong, a siren goes off and the lights on the map will start turning red."

Sharon led the boys to another part of the control room, where an electronic diagram covered one wall.

"This looks like a NASA display," Legs said.

"Yes," Sharon replied, "but this diagram shows all the heating and air conditioning units around "Fantasy World's..." Her words were cut short, as suddenly the underground command post reverberated with a shattering screech. Looking back, Chip could see that the volcano map had sprouted red dots all over.

Sharon turned and raced back to the volcano ride controls. She flicked off the siren, and began asking the technicians what was wrong.

"It's speed, Sharon," one of them said tensely. "The lead car's going crazy. It's getting faster each trip through the volcano. If we can't slow it down it could jump the track."

"Why don't you just turn the ride off?" asked Legs.

"The sudden stop and darkness could cause panic," Sharon answered. "I need to know what's gone wrong."

"No mechanical failure," shouted a technician. "Must be a bug in the program some place."

The computer control staffers were quiet, but Chip could tell from their tense expressions that they were worried. "The computer's feeding the wrong numbers to the motor," another worker shouted. And suddenly, Chip realized what must be wrong with the volcano ride.

"Sharon," he cried, "does this ride use arrays?"

"Why, yes," she said, startled. "But how do you...?"

"Never mind," Chip said excitedly. "If you can, try to change the loops around. Put the inside loop on the outside and put the outside loop on the inside. I think that's the problem."

A technician sitting at the console didn't look convinced, but Sharon curtly said, "Try it, Charlie."

The man's fingers flew over the computer keyboard. Computer commands flashed on the display screen and disappeared. The technician spoke while staring at the screen. "Okay, here are the two loops," he said. Chip leaned over and peered at the screen. This is what he saw:

"I wound up making the computer do the opposite of what I wanted. I guess that shows how computers are still dependent on people."

```
FOR SPEED = 1 TO 8
FOR CIRCLE = 1 TO 8
LET CAR = CHART (SPEED, CIRCLE)
GOSUB 5000 ADJUST SPEED OF CAR MOTOR
NEXT CIRCLE
NEXT SPEED
```

"Now, I'm switching them," the technician declared. He pressed some keys and the screen changed to this:

```
FOR CIRCLE = 1 TO 8
FOR SPEED = 1 TO 8
LET CAR = CHART (SPEED, CIRCLE)
GOSUB 5000, ADJUST SPEED OF CAR MOTOR
NEXT SPEED
NEXT CIRCLE
```

"Now, patch that into the working program," Sharon ordered. Charlie went to the keyboard again.

"That's it," he said, with a sigh.

Anxiously, they all looked up at the volcano ride's control console. Red lights were everywhere. Then, one green light appeared. And within seconds, green lights were popping out all over the control map. Chip, relieved, realized that the car was slowing down.

Sharon threw her arm around Chip, her face creased into a huge smile. "Great work," she said. "But how did you know what was wrong, Chip?"

"I didn't know," Chip answered, "it was just a guess. But when I heard that the wrong speeds were going to the motor, it made me think about the arrays Sam Johnson told us about at the simulator. He had a problem with backward loops. I thought you might have one, too."

"Good thing for us you thought of it," Sharon said, with relief.

"But why did the ride work earlier when we were in it?" Legs asked, searching his pockets for a Jupiter Crunch bar he'd stashed away. Excitement always made him hungry.

"I'm afraid that's my fault," Charlie said sheepishly. "When we decided to slow the volcano coaster down, we put some new, lower numbers into the array. It was my job to enter the new numbers in the program and when I did it just a little while ago, I must have switched the loops by mistake. I wound up making the computer do the opposite of what I wanted. I guess it shows how computers depend on people. "I'm sorry, Sharon."

"Well, everyone makes mistakes, Charlie," Sharon said. "But be more careful in the future. Someone could have been hurt. Meanwhile, let's see the numbers, can we?" On command, the screen showed the numbers in the volcano ride's array:

25	24	27	28	22	24	24	26
26	23	27	29	21	25	22	23
24	25	25	30	22	23	21	25
22	25	21	31	24	26	22	24
23	26	23	30	25	27	24	27
25	26	24	29	25	26	26	29
28	29	28	31	28	29	30	32
31	32	33	35	32	34	35	36

"There it is," Sharon pointed out, looking at the chart. "There's the problem. You see, the outside loop was supposed to read these numbers from top to bottom. Then the inside loop would shift the computer's attention one column to the right.

"When Charlie's error shifted them backwards, the computer read the numbers from left to right and then shifted down one row. All the biggest numbers are on the bottom row, and when the computer read those to the motor, the car went wild. It would have crashed for sure without your quick thinking, Chip."

"Can we see more of the control room now?" Legs asked anxiously. "This has really been interesting."

"I think we've all had enough excitement for one day," Sharon said. "Now I've got to get back to work. But you guys deserve something special. Wait, I'll be right back."

Sharon disappeared into her office for a minute. When she came back, she gave Chip and Legs free passes to "Fantasy World"—good for the entire year.

"After all," Sharon said, "you saved the ride. The least we can do is let you on it as often as you wish."

Adapted from the book CHIP MITCHELL: THE CASE OF THE ROBOT WARRIORS by Fred D'Ignazio, by permission of the publisher, Lodestar/Dutton. *© 1983 by Fred D'Ignazio*

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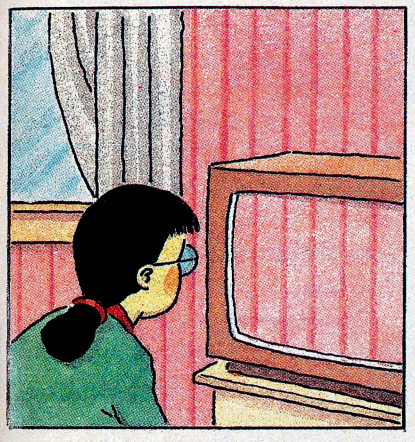
bits

(Continued from page 9)

MELLOW TAPES

Next time you feel tense, try staring at the wallpaper. According to Nebulae Productions of New York, Video Wallpaper—soothing, repetitive images that you play on your TV screen—is one way to ease stress. Just pop a Nebulae videotape into your player and the "wallpaper" appears on the screen.



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You can relax by spending hours watching water lap at the sides of a rock in the cassette that's aptly named "The Rock." Or, even if your father never stepped anywhere near a body of water bigger than a bathtub, you might be calmed by "The Stream On Dad's Birthday." We think, however, that after watching these cassettes, you might decide that you prefer being tense.

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Suppose a tornado has torn down all telephone wires. Communication is impossible. You need to signal for help. What do you do? If you've got the right equipment, you could plug in NASA's new electronic rescuer.

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With this gadget, E.T. could have phoned home—collect!

COFFEE, TEA, OR VIDEO?

Flying 30,000 feet through the air in a plane will no longer mean you've got to endure video game withdrawal. Beneath the lid of your flip-down food tray table you'll soon find *Airplay,* a selection of five miniature games including *Donkey Kong, Jr., Mickey Mouse* and *Tennis.* Flight attendants will activate your tray for about the same price as it would cost to rent a movie headset. For the duration of your flight, you'll have unlimited play.

This fall, six airlines (including TWA, United, Delta, Pan Am, and U.S. Air) will try out *Airplay,* created by the Altus Corporation in California. But Doug Crane, company president, sees more than flying in the future. Amtrak and two children's hospitals will also be testing a land version of this compact game tray.

Crane hopes *Airplay* will really take off this January. But there won't be any violent games aboard the planes. Crane says, "Airlines aren't keen on games with anyone falling or shooting."

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(continued from page 11)

you only control one player at a time. Control does not shift to a receiver until the pass is thrown.

WRAP-UP

PHIL: If you're willing to work at it, this can be a very fine game of strategy. But it's complex to play.

BERNIE: That's the penalty you pay for increased realism—complexity. This is very serious football.

TURBO

(Coleco, ColecoVision, $59.95)

"This game has the looks and style of a Ferrari."—Bernie
"Steering and acceleration are great, but two gears are not enough."—Phil

Turbo offers nice graphic effects with a variety of gorgeous scenery. You drive through city streets, down curving country roads, around hairpin turns flanked by walls, and out into the desert.

You'll find a lot of nicely animated cars to pass, which is rarely a problem on the straightways. But just wait until you're careening around a turn! Watch out for snow conditions—and be careful, because you don't have as much control when the road turns white. Hills are no problem, though; when a car disappears for a moment, you know it will not change position on the track.

The price of the game includes a special steering wheel for very fine driving control and an accelerator that is foot-operated. The joystick acts as the gear shift, which we think would have been more useful with four gears.

WRAP-UP

PHIL: Even a poor racer can drive quite a ways before the game ends. And a good driver earns extra time on the track, which I like.

BERNIE: It's a good adaptation of the arcade game, but I sure wish you didn't get hit from behind when you're trying to get back into the race! The game takes a lot more skill than most driving games.

SOCCER

(THORN/EMI, Atari 400/800/1200, $44.95)

"The most playable simulation of a team sport I've experienced."—Bernie
"A revolution is now due for all team sports."—Phil

This new 16K ROM cartridge has paved the way for a whole new line of sports games that will truly allow for team participation. And that is what sports are all about.

The soccer field consists of three screens, one for the midfield area and one for each goal. When the ball nears the edge of one screen, every thing neatly scrolls into the next, so you always know exactly where you are.

As in the real sport, this game provides 11 men to a team. But to fit that many players onto the screen they must be quite small—our only major criticism of the game. A player can dribble the ball realistically with his feet by moving into it. However, the defensive player can outrun the ball carrier. So, video *Soccer*, like genuine soccer, is a passing game. And it really works well.

Because joysticks are designed to control one character at a time, sports games in general have suffered from stiffness and uneven action. Soccer, however, uses a brand-new idea: a press of the joystick button transfers control of your joystick to the player nearest the ball, which allows you to pass and dribble with incredible power.

WRAP-UP

PHIL: The best feature of this game is that one to four people can play, provided you have that many joysticks. All four can play as a team against the computer, two against two, one against three, any way you want to set it up.

BERNIE: When you press the button and transfer control, the new man momentarily becomes a number—the number of your joystick. That lets you switch control quickly without a great deal of confusion. It's a nice mechanism; I hope we see more games using it in the future.

ICE PIRATES

(Game begins on page 4)

You don't even have to fight. The Ice Kadets are afraid of the sizzling saber. They don't want to become Shish-Kabob-Kadets and so they run away in fright. Now it's just you and Glich.

Go to page 21.

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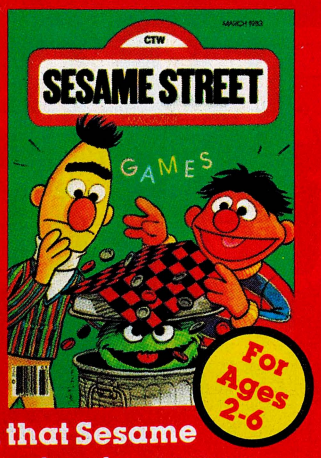

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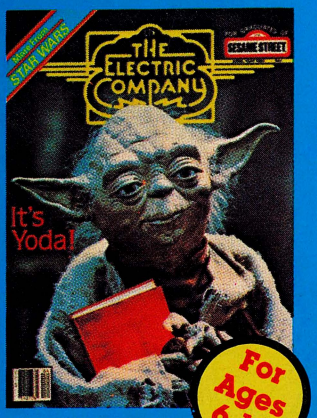

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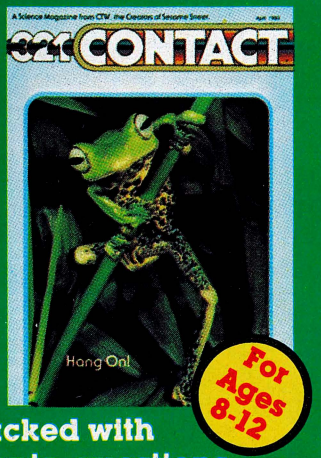

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8SAD9

answers

FLOWCHART QUIZ *(page 46)*

1. One arrow belongs between "NO" in the "STAYS?" box and "CHASE WET DOG." Another arrow is needed between "CHASE WET DOG" and "FORCE IN DOG."

2. If you don't spill ketchup on you, you spill mustard.

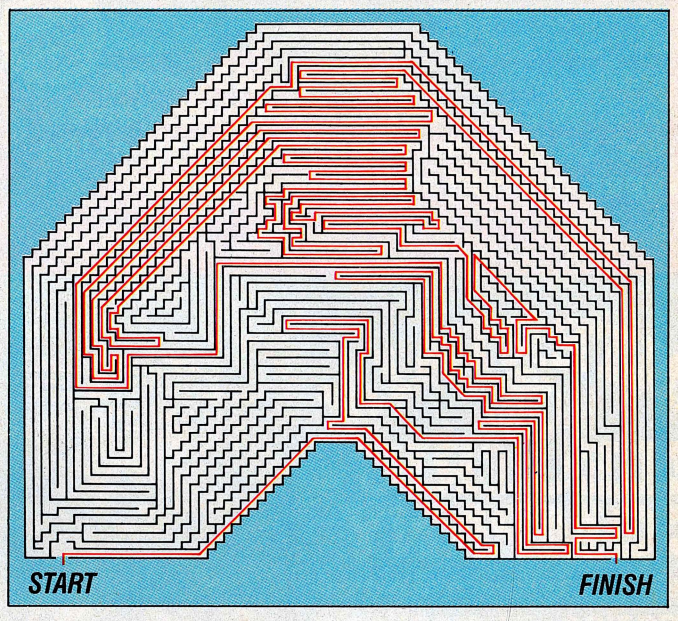
3. You will have to keep ordering food forever. In other words, a computer never gives up.

4. The two mistakes are: (1) There is no "NO" choice at "MOUTH FULL?" and (2) If you wipe your mouth on your friend, there are no instructions about what to do next.

5. If you are not shabby, you go to the movies.

6. The flow chart ends when you answer "NO" to the question, "DO YOU HAVE MORE THAN 62 CENTS?"

BELA'S MINDBENDER MAZE (page 44)



next

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ROCK AND ROLL COMPUTERS: Find out how rock musicians—including Thomas Dolby, Stevie Wonder, Neil Young, the Police, Styx and Billy Joel—are using computers to make a new kind of music. Plus reviews of the top electronic LPs of 1983, and tips on how you can become a computer musician for $50 or less.

GAME SYSTEM OR COMPUTER?: You love electronic games. Should you buy a game system or a computer? Does it make sense to convert the system you already have into a computer? A close-up look at the very best hardware available today for all game players.

ON-LINE LIFE WITH FATHER: Denise, 15, is part of a family of the future. Her father is a telecommuter, someone who works at home on a computer. Denise talks about how it affects her family's life.

PLUS: The ways computers are changing pro football strategies, reviews of the top home games of the year, a program for your own adventure game, and much more!

ICE PIRATES

(Game begins on page 4)

Well, that's another vine mess you've gotten yourself into. The red vine is only semi-dry; your hand slips, and the vine entangles you. Glich flicks the switch. Nice arcades become ice capades. Tough break. Try to stay warm. Glich will get to you...soon.

GAME OVER.

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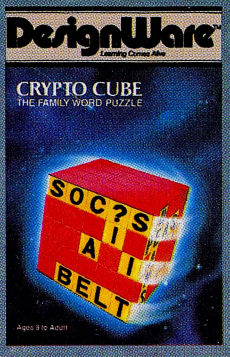

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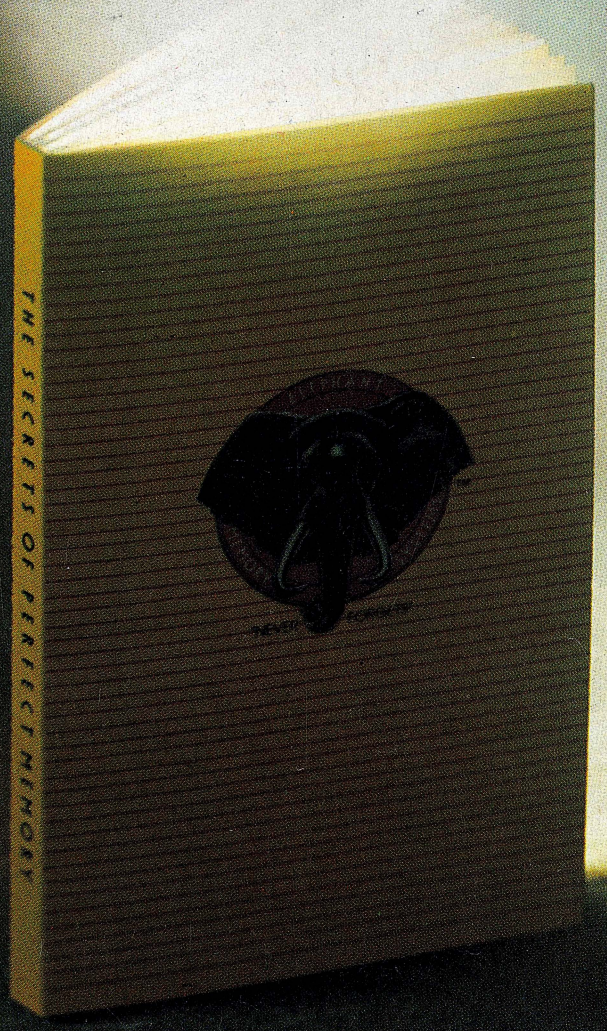
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